

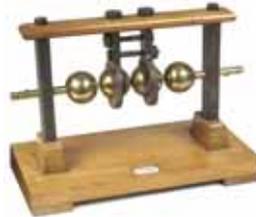
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**Taking the reins
on uncatalogued
veterinary
collections**



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**Guglielmo
Marconi:
a world of
archival
heritage**



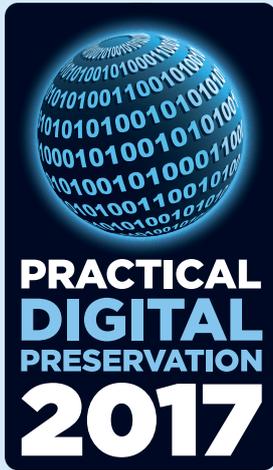
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**Imperial
science and
technology:
a tale of two
collections**



Science and Archives Issue

The National Geoscience
Data Centre and
National Geological
Repository: a different
sort of archive!
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Practical Digital Preservation 2017

An exciting series of events combining executive briefings led by key industry speakers and workshops designed to support archivists and records managers to raise awareness of the importance of digital preservation within their business and with IT stakeholders.

Bring Your IT Manager: Protecting Digital Information - The Importance of a Digital Preservation Strategy

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ARA website, www.archives.org.uk/events or call 01823 327077

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ARA website or visit www.preservica.com/resources

“This programme is key to supporting our members’ efforts to raise awareness of the need to properly govern long-term and permanent digital information with their senior management and IT teams.”

John Chambers,
ARA CEO

“As more of what we all do becomes digital, it is vital for key decision makers within the organisation to understand the risks to long-term digital records.”

Scott Sammons,
IRMS Chair



Archives & Records
Association
UK & Ireland



Preservica
Digital Preservation

Welcome to ARC Magazine April 2017

Welcome to the Science and Archives issue of *ARC Magazine*. Awareness of scientific archives has been increasing in recent years and this issue clearly demonstrates why such a development is important. The scope of scientific archives is wide and there are many challenges that need to be met; for example, regarding the capture of information and liaison with the scientific community. This month's articles present a wide variety of voices, from archivists safeguarding historic collections to those professionals responsible for ensuring that the evidence of current activities is not lost to future generations. We also have contributions from researchers, demonstrating some of the richness of material to be found in scientific archives. A strong case is made for the desirability of creators, custodians and users of scientific archives to all work closely together. This is an approach that we should all reflect upon, regardless of the subject matter of the archives in our care.

Elsewhere in the issue, there is news of a scholarship opportunity for conservators and bookbinders. The deadline for applications is fast approaching but it's not too late to apply. Also fast approaching are the changes to the ARA's CPD offer. Please take a moment to read the information presented here and keep an eye out for more to come in the following months.



Our thanks go to all those who have contributed texts, and particularly to Anne Barrett for co-ordinating the Science and Archives articles.

Enjoy the issue!

Richard Wragg
ARC Editor

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Front cover: Students from Imperial College using the NGR core examination facilities

DISCLAIMER

The Archives & Records Association (UK and Ireland) cannot accept responsibility for views expressed by individual contributors to ARC Magazine. It is a medium for informing members of news, information and ideas relevant to the profession, including archive conservation. It is not an official guide to procedures, concepts, materials or products.

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opening lines

Lorraine Bourke of PRONI



It's funny how the familiar can seem strangely unfamiliar. I had that feeling just last week when I ventured for the first time in many years into the City of London to present at the Pharmaceutical Quality Group's Data Integrity Workshop. Within the City road and rail connections remain as I remember them but (with the notable exception of the Barbican Centre) the cityscape was otherwise changed almost beyond recognition. Aided by a pedestrian pace I soon adjusted to the new environment thankful for myriad maps and signposts. All of which had me thinking that the same is true for my profession (records management, RM) and industry (pharmaceuticals) in which I work as a freelance consultant.

When The Scientific Archivists Group (SAG) was established in 1981, responsibility for medicines approval and licensing rested with the Medicines Division of the Department of Health for Human Medicines, later to become (in 1989) the Medicines Control Agency, which merged

with the Medical Device Agency in 2003 to become the Medicines and Healthcare products Regulatory Agency (MHRA).

In response to advances in scientific research and the increasingly international nature of the market for medicines, the International Conference on Harmonisation was conceived to rationalise and harmonise regulations. This led to the European Union, the United States and Japan signing up to the ICH Harmonised Tripartite Guideline for Good Clinical Practice in 1996. In the meantime, the European Medicines Agency (EMA) was established in 1995 to coordinate and provide regulatory support to EU member states in relation to the regulation of human and veterinary medicines.

The emergence of these regulatory agencies generated a raft of new guidelines, standards, regulations, and laws for reporting and evaluating the data on the safety, quality and efficacy of new medicines. The focus on regulatory compliance and on evidence-based research increased awareness of the value of records, the oft-repeated regulator's mantra being "if it is not written down, it didn't happen".

In common with all records managers, those of us in the life sciences have also needed to adapt to rapid technological change. In 1981, the world was largely paper-based: today, the prevalence of electronic communications, electronic data-capture solutions and trial-master file solutions, and digital analytical equipment have facilitated scientific research, accelerated time-to-market, improved collaboration and delivered operational

efficiencies. But they also present unique challenges to archivists and RM professionals responsible for managing and preserving those electronic records for the very lengthy periods required by regulation.

SAG has continued to respond to these changes. Founded with the aim of exchanging knowledge relating to archives with scientific application, the group has expanded to include all aspects of the management of records within the regulated life science and healthcare sectors in the UK and Europe. In the past year alone, the group has published advice on: the impact of the new clinical trials regulation EU 536/2014 and ICH GCP revisions; digital archiving; the role and use of PDF in records retention; e-records and data migration; the selection of electronic trial master file solutions; the generation of "certified copies"; computer systems validation; and data integrity.

SAG continues to support its members and key stakeholders through events, training, and networking, with the goal of keeping members abreast of trends and developments in technology and regulation. We are fortunate to have well-established links that enable us to influence regulatory agencies and industry bodies. So, while we find ourselves responding to constantly changing and previously uncharted, strangely-familiar-yet-unfamiliar, landscapes, it is also an exciting space and time to be a records manager.

Russell Joyce

Executive Committee member
Scientific Archivists Group

(www.sagroup.org.uk)

Continuing Professional Development (CPD) News

(Incorporating Registration News)

The ARA Board made some important decisions at its most recent meeting on 13 March in the transition to the new **ARA Continuing Professional Development (CPD)** programme. Crucially, the Board agreed (having secured permission from the association's auditors to change our reserves policy) to fund - from our financial reserves - the recruitment of a CPD Programme Manager.

The Board also agreed a job description for the role. We will now get on with advertising the post and recruitment in the next few weeks so that the new person can be in place well before the launch of ARA CPD at the annual conference in late August.

The Board also gave clear general guidance to the ARA CPD Steering Group as it finalises the programme design. For example, it asked that the Group minimise barriers to participation, maximise tangible benefits to participants and ensure that the programme is designed to be financially self-sustaining. This guidance should help the ARA CPD Steering Group achieve a final product by May – including accommodating feedback from the Board and membership on issues such as 'revalidation', post-nominals, the new Fellowship and Foundation-level categories of professional development, and so on.

The Board will look at specific options for fees at its next meeting – and continue to take soundings from members, eg from ARA officers and attendees at the AGM in May. All of this should be done and announced by June. The goal remains to get the best-possible and most flexible model in place by the time of launch.

Our continuing, collective thanks go to the hard-working volunteers within our own ranks who have given (and continue to give) so much of their private time to get ARA CPD to the starting line.

Last but not least, after various iterations and changes, the ARA CPD Steering Group has voted on a new logo for the programme. See its first public appearance on page 7!

We have not forgotten the many members still engaged with the current **ARA Registration scheme**.

Here's an update on developments on that side.

Newly registered members of the Archives and Records Association

Following the autumn 2016 assessment round of portfolios submitted to the assessors, the successful candidates are as follows:

[Robert Athol](#)

College Archivist, Jesus College, Cambridge

[Gillian Butler](#)

Heritage Team Leader & Borough Archivist, Royal Borough of Kingston Upon Thames

[Stacey Dyer](#)

Executive Archive Director, South West Film & Television Archive

[Anna-Maria Hajba](#)

Consultant Archivist, Glucksman Library, University of Limerick

[Adam Hillhouse](#)

Records Manager, Lancashire County Council

[Erin Lee](#)

Archivist, National Theatre

[Janice Miller](#)

Information and Archives Officer, East Dunbartonshire Leisure and Culture

[Sarah Norman](#)

UK Legal Entity Outsourcing Analyst, Bank of New York Mellon

[Louise Pichel](#)

Assistant Archivist, Library and Museum of Freemasonry

[Katharine Short](#)

Archivist, De Montfort University, Leicester

[Victoria Sloyan](#)

Archivist, Wellcome Trust

Nicholas Smith

Archivist, V & A Archive

Annabel Valentine

College Archivist, Royal Holloway, University of London

The committee would like to congratulate the newly registered members on their success.

We would also like to acknowledge the efforts of the successful candidates' mentors:

Gillian Cooke (Cambridge Assessment), Clare Wood (Southbank Centre, London), Louisa Blight (Plymouth City Council), Carol Quinn (Irish Distillers Pernod Ricard), Gavin McGuffie (The Postal Museum, London), Penny Hutchins (National Army Museum), David Powell (D C Thomson & Co Ltd, Dundee), Jessamy Carlson (The National Archives), Rachel Cosgrave (Lambeth Palace Library), Rod Stone (The Royal Bank of Scotland Group), Jenny Bunn (Department of Information Studies, University College London), David Carter (Prudential PLC), Jenny Childs (Cadbury Research Library, University of Birmingham)

The committee would like to thank them for the time and support they have given to their candidates.

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regschemeevents@archives.org.uk

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Registration Scheme Communications Officer:

regschemecomms@archives.org.uk

Registration Scheme Mentor Queries and Advice:

regschemementors@archives.org.uk

Jon Elliott

Head of Public Affairs, ARA

Richard Wragg

Communications Officer, Registration Scheme

“Don't forget: Existing candidates have 5 months to submit their portfolio under the existing Registration Scheme.”

A basic guide to ARA's new CPD programme: part one

There are three immediate things that you need to know about ARA CPD (Continuing Professional Development):

1. It launches at the ARA annual conference in Manchester in August. It is entirely voluntary, but you do need to be an **Individual Member** of the ARA if you want to enrol.
2. The goal is to help members at any level record their progress or become more competitive/skilled in current and future roles, and help employers to develop a key (human) resource and to put record-keepers on a par with other professions;
3. We have to meet the costs of running ARA CPD. This means asking those taking part to pay modest fees to cover the cost of employing a Programme Manager and running the online platform **Mahara**. Any fees will always be kept to a minimum. We surveyed members on this last year, and (several hundred of) you gave us some clear messages.

Why ARA CPD and How does it Work?

ARA Continuing Professional Development (ARA CPD) is about developing and maintaining professional competencies. It applies to anyone working in (or with) records in the public, private and voluntary sectors, at any stage of a career or participation in the sector. You 'own' your ARA CPD: you can fit your development activities into your schedule and/or workplan.

ARA CPD is based around the **Framework of Competencies**: the skills, knowledge and



New CPD Logo

behaviours whose development and deployment may lead to improved performance. Most organisations now use competencies to recruit and assess the progress of their people.

The Core: Competencies and Work Areas

The Framework comprises **39 core competencies**. That is a lot. But we need that many to fully reflect the diversity of our community. We are finalising details and definitions for each one. More to follow next time on this.

These core competencies are structured around **three key work areas**:

- Organisational: e.g. your role in and across the workplace;
- Process: e.g. the work that you do;
- Stakeholder: e.g. where and how you interact with others.

Over time, you ‘score’ your progress yourself by each recorded activity according to an **attainment level** (from 1 to 5, with 5 the highest). Your assigned ARA CPD assessor will evaluate your self-scoring and progress when you are ready for formal assessment. As you move through the ARA CPD Pathway from Foundation to Fellowship, you will need to show evidence of more of the 39 competencies, with higher attainment scores, over more work areas.

The ARA CPD Career Pathway

ARA CPD offers three milestones:

- **Foundation:** you should aim for this level if you are new to the records community, perhaps working as a trainee or at assistant level or in a (new) volunteer capacity, and do not have a relevant degree or diploma;
- **Registration:** if you have a degree or diploma and some professional experience, or you do not have a degree/diploma but do have significant experience;
- **Fellowship:** if you have passed and/or revalidated at Registration level and can demonstrate competencies at the leading edge of the profession at any stage of your career. This is not a ‘seniority award’.

In May’s edition of ARC, we will focus more on how and when you can go about enrolling in ARA CPD. Don’t worry: full ‘Guidance Notes’ on how ARA CPD will work will be issued before the launch covering the nitty-gritty details, including ‘self-scoring’. If you have any questions, please email the Steering Group at cpd@archives.org.uk

Jon Elliott

Head of Public Affairs, ARA

Mythbuster

‘Revalidation’

Under ARA CPD, qualified members wishing to retain Foundation, Registration or Fellowship level will need to revalidate after a certain number of years. We’re revisiting how often this should be, in response to feedback from last year’s survey. But one thing is very clear: revalidation does not mean ‘requalification’. You will not have to go through a full portfolio submission repeatedly to retain your ‘level’. Revalidation will be light-touch, designed to help you show that you are on top of developments in your area of interest and keeping your ‘level’ current.

Collecting Matters

In February 2016, Collecting Matters introduced The National Archives' ongoing review of the collection, curation and use of modern and contemporary archives of science, engineering and related disciplines. It noted that no institution is able to take responsibility for the nation's scientific archival heritage alone, nor is that desirable. There is a need for partnerships which encompass interested institutions, organisations and individuals. The review resulted in an options paper, now available online on The National Archives' (TNA) website: <http://nationalarchives.gov.uk/archives-sector/projects-and-programmes/science-technology-archives-group/>

The options paper offers nineteen recommendations in three areas relating to the need to: improve access to and exploitation of existing sources (including those here at TNA); improve archival capture of contemporary scientific records; and ensure long-term constituency infrastructure to support sustainability.

Since February last year there has been significant progress in following up on these recommendations; indeed some of the progress is reported elsewhere in this issue. Two workshops were held to discuss the options paper and its recommendations and a network has been formed, the Science and Technology Archives Group, for all those interested in the creation, use and curation of archives of science and related disciplines. More information about these can be found via the link above.

A European science archives workshop was also held in Heidelberg, from which the core of an international science archives network may emerge.

The next step will be a launch event at the London School of Hygiene and Tropical Medicine later this month. If you are interested in this or any aspect of the archival dimension of Britain's scientific and technological heritage and achievement, please do join the STAG network.

Tim Powell

The National Archives (UK)

asd@nationalarchives.gsi.gov.uk

Time to Start Thinking About Conference

We have had a great response to the call for papers for the ARA Conference in Manchester this year (30 August to 1 September). The ARA Board has also now agreed the fees – **£189** for a day rate (around 15% lower than London last year) and **£549** (around 8% lower than 2016) for full residential attendance over the three days.

Note that, unlike most other conferences, the residential fee includes food and accommodation. And for only £10 extra a night, your partner can join you. If you can find a better-value all-in conference in our sector, we'd like to hear from you.

The draft programme for Conference will issue in the next couple of weeks: keep an eye out for details in ARA Today and the next edition of ARC. We are planning an enhanced archives and records stream, especially on the records management side, and aim to repeat the outstanding success of the digital preservation stream in 2016. The conservation stream is also shaping up to be as exciting and innovative as ever.

Our Conference reception this year will take place at the amazing National Football Museum in Manchester, kindly sponsored by our friends at Bruynzeel Storage Systems. I know many members have been looking at developing the archives and sport angle.

What better way to discover some new ideas, combined with excellent networking with your peers and a relaxing glass or two after a busy day?

For regular updates, visit the Conference website page: <http://www.archives.org.uk/ara-in-action/the-ara-conference.html>

John Chambers

CEO, ARA



ARA app – a new addition to the family

As many members will know, ARA has launched an app for members. The app can be downloaded easily and works on Android and Apple devices as well as on Kindle Fire tablets.

We envisage that the app will soon become your main gateway to everything on the ARA website, giving you greater flexibility of access, so that you are not tied to a desktop or laptop. Initially, it will just contain major communications. Over time, more content will be added.

Eventually, the app will develop into a mobile hub for members to access information and, hopefully, audio/video content and webinars. Our goal is to improve member experiences and deliver added value, including in terms of the immediacy and flexibility with which members can receive and share information.

How to download

If you are familiar with downloading apps, then the ARA app will be easy to find and install – go to the Google Play Store, Apple App Store or Amazon (for Kindle Fire) and search for “Archives and Records”. A more detailed, step-by-step guide for the relatively (or totally) uninitiated is available via the Publications page on the ARA website.

You’ll need your existing ARA website user name and password to log in to the app. If you have forgotten one or both, or have never had a user name and password, you’ll need to reset/apply via the ARA website.

We will also ask members to revalidate their app details every three months – as a basic security precaution.

The benefits

Members that download the app will benefit from (or contribute to) greater:

- Efficiency – faster communication; you’ll get (and be able to share) information more quickly.
- Mobility – information – eg, on job opportunities - will reach your device wherever it is (and you are).

www.archives.org.uk

- Convenience – you can keep in touch wherever and whenever it suits you, i.e. wherever there’s a mobile connection.
- Web-enabled access – when we publish new documents and information with the app, it can be web enabled, with links taking you straight to the website or hyperlink connection being referenced.
- Engagement - the app enables ARA to better engage with members, and enables members to better engage with each other.
- Value for money – the app helps us reduce publication printing costs and offers another platform for possible advertisers: all this helps us redirect resources to front-line priorities and keep ARA membership subscriptions as low as possible.
- A better environment - by reducing the amount we print, we use less paper and materials associated with packaging and distribution, and emit fewer greenhouse gases.
- Professional development - we hope that the app will open up new opportunities to hold webinars and other video/audio content.
- Things we haven’t thought of yet! - we’ll welcome members’ ideas on how the app can grow and develop in the coming years.

We need your feedback

We’d love to hear what you think, so please send us through your ideas on how we can improve the app, make it more user-friendly or develop new services. We might not be able to do everything at once, but we’ll want to do as much as we can as often as we can. Please send your feedback to app@archives.org.uk

John Chambers

CEO, ARA

Apply now for book conservation summer school scholarship

Re-creating the medieval palette, an Italian fifteenth century binding and a conservation variation for the Ethiopic binding are just some of the topics the winner of this year's Nicholas Hadgraft Memorial Scholarship could be enjoying thanks to Conservation By Design Limited (CXD).

CXD invites conservators and skilled book binders to apply for the renowned scholarship for the 13th consecutive year. The winner will receive £1,500 towards the cost of attending the Montefiascone Book Conservation Summer School, a unique bookbinding & restoration course held each year in the medieval town of Montefiascone, Italy.

Running from the heart of the medieval town throughout the month of August, each week, the summer school features a different specialised course and tutor, which this year includes: Cheryl Porter, Jim Bloxham, Shaun Thompson, Alison Ohta, Scott W. Devine, Marco Di Bella and Dr. Nikolas Sarris.

Conservation By Design's managing director, Dirk Hendrickx, said:

"Every year we receive many high quality applications and it is a privilege for Conservation By Design to support the Nicholas Hadgraft scholarship. Many previous winners have seen their career go from strength to strength thanks to the skills and contacts acquired at the Montefiascone Summer School. The atmosphere is great and participants will find fellow students and tutors very supportive. With anticipation, we await to see this year's applications and are always available to answer questions about the scholarship."

Samuel Foley was a final year student studying for an MA in Conservation, specialising in Books and Archive Materials at Camberwell College of Arts, when he was the lucky recipient of the 2016 scholarship. He used the

scholarship to attend all four weeks, receiving tuition from: Jim Bloxham, Shaun Thompson, Anne Hillam, Kristine Rose and Gaia Petrella.

Samuel commented:

"I had the very special privilege to be able to spend time in the library and study the bindings. Having been almost entirely untouched, the library provides a rare resource for conservators and book historians with original structures preserved and sometimes exposed by historic damage."

I had an unforgettable time in Montefiascone, the courses were exceptional and I learnt a huge amount. The icing on the cake though was the people I got to meet and share this experience with. It is strange to find a group of warm, friendly, like-minded people from all over the world gathered in a small rural town in Lazio. Everyone was great fun and was open to sharing ideas and experiences. Many people I met had been to Montefiascone more than once. This speaks volumes about how unique the project is, not only for the library but also to the people who attend."

The scholarship is offered in memory of Dr Nicholas Hadgraft, a good friend of Conservation By Design who died tragically in 2004. Nicholas was a fellow of the University of the Arts London and a key collaborator on the 'Squelch Drying' technique devised by Stuart Welch (the founder of CXD), the most effective way to date of drying valuable rare books.

Application forms are now available from the CXD website (www.conservation-by-design.co.uk). Completed applications must be received by 7 April 2017 and the successful applicant will be notified by the end of April.

For further information on the Nicholas Hadgraft Memorial Scholarship, contact Conservation By Design on 01234 844 260 or visit www.conservation-by-design.co.uk.

Long-term digital strategy: do it once, do it right

Chris Batt shares the outcomes of his PhD research.

“In the digital world, all of the objects that we have access to via the Web have been imbued with the ability to speak... This leads to the inescapable conclusion that, in the digital environment, the distinctions between libraries, museums and archives that we take for granted are in fact artificial.”¹

This article focuses on the implications and outcomes of Collecting Institutions in the Network Society,² my PhD research at University College London. Echoing Bob Martin’s view above, my hypothesis was that the traditionally highly fragmented, top-down structures of public service severely limit response to new digital opportunities. The research aimed to provide tangible evidence supporting the hypothesis and to propose approaches to future developments based around the convergence of the development and delivery of digital assets.

The methodological approach involved four stages:

1. understanding the fundamental effects that make the Internet such a powerful agent of socio-technical change;
2. examining the contemporary purposes and operational practices of public collecting institutions (museums, libraries and archives) to identify similarities and differences;
3. comparing the evidence from stages one and two to highlight similarities and differences;
4. from that comparison, presenting strategic challenges and opportunities for future planning of digital services maximizing user value.

Intermediate outcomes

There were specific outcomes from the first two stages of the research on which the recommendations for action were based.

Using academic and populist literature, the Internet’s development and social impact between 2000 and 2014

was explored. This produced a list of 37 key trends of socio-technical change ranging from the ubiquity of mobile technology to the fundamental restructuring of sectors such as retail and the recorded music industry. This list was further distilled into four Drivers of Internet Change:

1. **The Internet as digital common carrier:** a single, global channel with simple ubiquitous protocols encourages resource convergence and offers instant two-way communication;
2. **The Internet redefines space and time:** every network node instantly accessible; transmission costs independent of distance and time, enabling fast innovation and rapid social diffusion;
3. **The Internet possesses its own gravitational forces:** successful services grow rapidly due to viral marketing driven by social media, feeding increasing growth - the big get bigger;
4. **The Internet redefines the relationship between the supplier and the user:** traditional innovation had high capital development costs; digital innovation has low overheads encouraging risk taking and experiment; two-way engagement with user involvement in the development process.

An additional conclusion from stage one is that an agrarian-like revolution is taking place. The pre-2000 knowledge hunter/gatherer, relying on access to physical destinations, has now become online harvester.

Stage two, the purposes and processes of UK collecting institutions, involved analysis of all public strategies and policy documents, 2000-2014, and a survey of almost 1000 institutional websites to identify digital strategies and mission statements, for subsequent textual analysis. A review of all research literature on digital innovation across collecting institutions to identify scope and nature was also undertaken.

Analysis revealed a set of linked characteristics common to public collecting institutions, embracing the service/professional practices of collecting institutions: social value as long-term collectors and curators supporting formal and informal learning; the maintenance of physical collections in fixed locations and, more recently, the integration of Web 2.0 tools and digital collection building to enhance the user experience. Collecting institutions, of course, exist within broader organisational structures.

Public service today remains rooted in top/down command and control structures with collecting institutions forming components in a vertically integrated structure of policy and funding. This longstanding *Institutional Paradigm* provides mechanisms for sustaining policies, local priorities and accountability. The result is a highly fragmented landscape of collecting institutions where the institutional identity is paramount, constraining horizontal collaboration and shared policy within and across institutional sectors. Innovation is low-risk, grounded in existing service frameworks, lacks shared exploitation of the Internet and means that a single statement of social value that might influence national digital policy agendas is impossible.

The need for action

The final stage of the research sought to articulate these outcomes into a set of issues of practical use to practitioners and policymakers. The first issue was, in the absence of any explicit shared mission statement across collecting institutions, to see whether a convincing draft might be synthesised using the 26,000 word dataset extracted from published documents and websites. Using only the highest frequency words from the dataset the following was produced:

“The purpose of museums, libraries and archives is to maintain and promote collections and services to encourage people’s learning and enjoyment and to develop communities.”

As the collective voice of museums, libraries and archives, could this be a mission umbrella for joint advocacy digital strategy? Discuss.

The next issue was practical comparison between the four Generic Drivers and the characteristics of the *Institutional Paradigm* to draw out the tensions between opportunities enabled by the generic drivers and the challenges that would have to be overcome by collecting institutions:

Generic Drivers of Change: Opportunities	Institutional Paradigm: Challenges
Potential of Internet to increase social value of collecting institutions	Institutional Paradigm and lack of strategic planning
New relationship between supplier and user, new business models	Importance of status quo Long-established service patterns
The importance of presence in the digital space to meet emergent behaviours and build wider audiences	The value of the institution as physical destination
Rapid innovation and diffusion	The risks of radical change
Implications of strategic change	Constraints of structure and resources
Digital channel convergence Globalisation from gravitational forces	Organisational fragmentation Localism and vertical integration
Need for one voice and one message to promote collective value nationally	Absence of explicit shared mission across collecting institutions.

Two conclusions were derived from the analysis, highlighted in the summary table above. First, as audiences become increasingly active and experienced online harvesters, without significant convergence in digital collections’ innovation and delivery, collecting institutions will be unable to ensure maximum value to all citizens.

The second conclusion was that it is possible to identify from the comparative analysis three strategic challenges that must be addressed and debated at an early stage:

- finding common purpose in digital strategy - one voice, one strategy;
- focus on the exchange relationship between the service and the user - this matters more than anything;
- dealing with the speed of innovation and change.

It is my hope that, at the very least, these outcomes will encourage a debate about the future of digital

Welcome to the Science and Archives issue

Science and archives are both sectors continually evolving and making use of new technologies, a fact reflected in this issue with discussion on Wiki-a-thons, Cultural Blockchain and new Web based outputs. Archival involvement in areas such as student learning and teaching and cross sectoral working is increasing.

The value of archivists' work is becoming recognised via these outputs and more organisations are employing archivists for the first time. Historians of science value what we do, but there is always scope for more development of work with that sector as there is with scientists themselves. These issues were covered in the Scientific Archives Meeting in November 2016 and will be followed up in future international meetings.

The foundation of the Science and Technology Archives Group (STAG) also brings sectors together, and will devise a programme to further the aims of creating a network for all those who have an interest in scientific archives, to share knowledge and to raise awareness of the value of scientific archives in all media and formats for research, education and public enjoyment. This issue covers all these areas, thanks to the contributors sharing their work for us all to discover new ways of seeing science and archives.

Anne Barrett

services not simply grounded in the status quo models of today. The thesis presents a possible future 'do it once, do it right' model based around the central co-ordination of all developments - a Digital Knowledge Ecology - ensuring that, for the harvester, disparate collections appear as one seamless resource, regardless of their institution or form.

Quite impossible, of course. National boundaries, organisational structures, public policy and even practitioner worldviews all stand in the way, and in an age of financial famine risk-taking is the last thing on anyone's mind. Yet the future is still out there and looks set to be increasingly digital. My purpose was not to change the world of collecting institutions. Rather to shine a light on the challenges and opportunities that the digital future will bring; to demonstrate that increasing value depends on a shift from today's fragmented digital landscape towards the collaboration and convergence of the Digital Knowledge Ecology.

Over the long-term there could be huge benefits, explored in some detail in the thesis:

- a single, integrated citizen offer;
- new relationships with and between individuals and with communities;
- agile innovation;
- power and national influence through stronger advocacy;
- rethinking professional practice and development;
- redefining the concept of collection for the 21st century.

What we needed today is practitioners prepared to set aside the status quo long enough to begin a debate on more radical futures. Abe Lincoln said it best:

"The dogmas of the quiet past are inadequate to the stormy present. The occasion is piled high with difficulty, and we must rise with the occasion. As our case is new, so we must think anew and act anew."³

Chris Batt

Formerly of University College London

¹ R.S. Martin, "Cooperation and Change: Archives, Libraries and Museums in the United States" (2003, The Hague: IFLA)

² Available at: http://www.digital-futures.org/Digital_Futures/Collecting_Institutions_in_the_Network_Society.html; plus a more digestible briefing at: <https://dl.dropboxusercontent.com/u/15962924/BATT%20BRIEFING%20DOCUMENT.pdf>

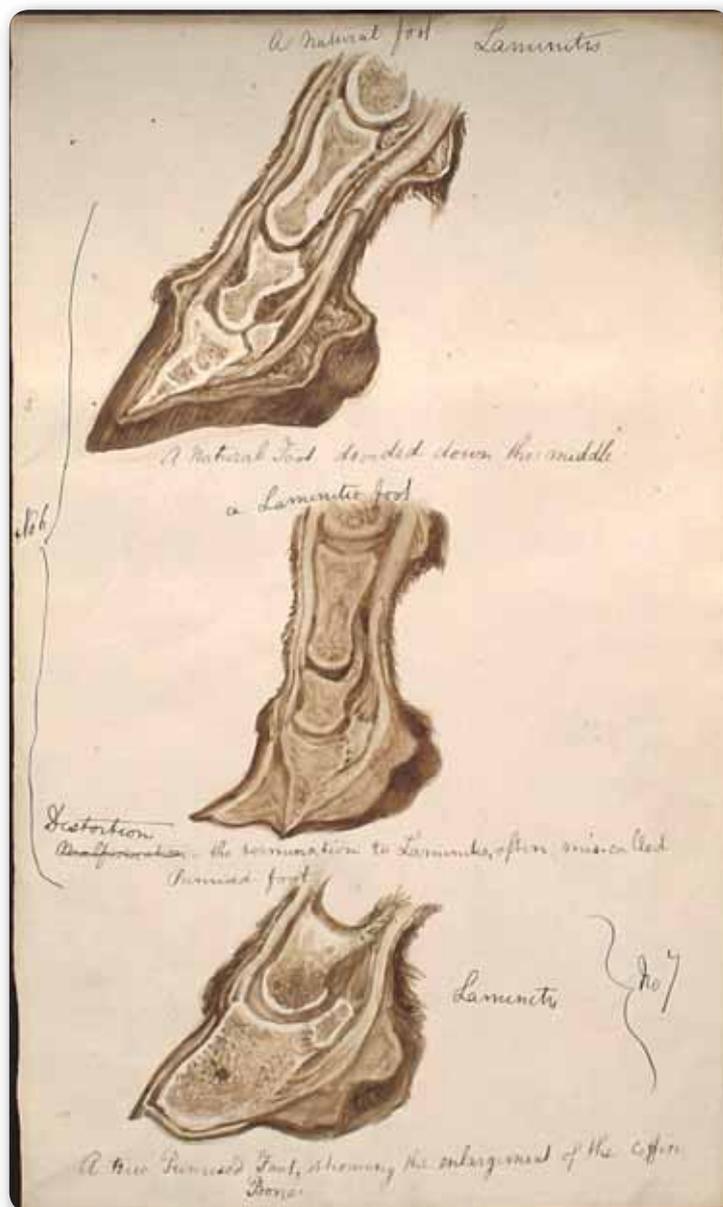
³ A. Lincoln, "Second Annual Message" (December 1, 1862) quoted in G. Peters and J.T. Woolley, *The American Presidency Project* [<http://www.presidency.ucsb.edu/>, accessed 28 February 2017]

Taking the reins on uncatalogued veterinary collections

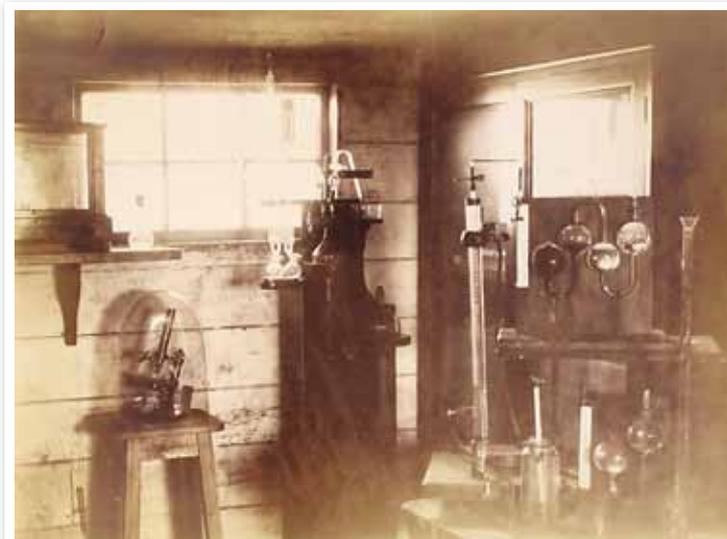
Lorna Cahill discusses her work as the first archivist at the Royal College of Veterinary Surgeons Trust.

When I began work as the first archivist at the Royal College of Veterinary Surgeons Trust (RCVS Knowledge), I was excited by the opportunity to start from the beginning with a collection. There was no legacy system of organisation to try and unpick, and no ingrained bad handling habits by staff and visitors to fight against. Fortunately, what RCVS Knowledge did have was an enthusiastic librarian in Clare Boulton, who was very keen for the collections to finally get the attention they deserved, and knew that a qualified archivist was essential. Funding was secured from The Alborada Trust for the five year Vet History project, and I was recruited to catalogue the major collections and manage the digitisation of highlights from both the archive and library. The main goal is to make these resources as accessible and visible as possible for both veterinary professionals and the general public.

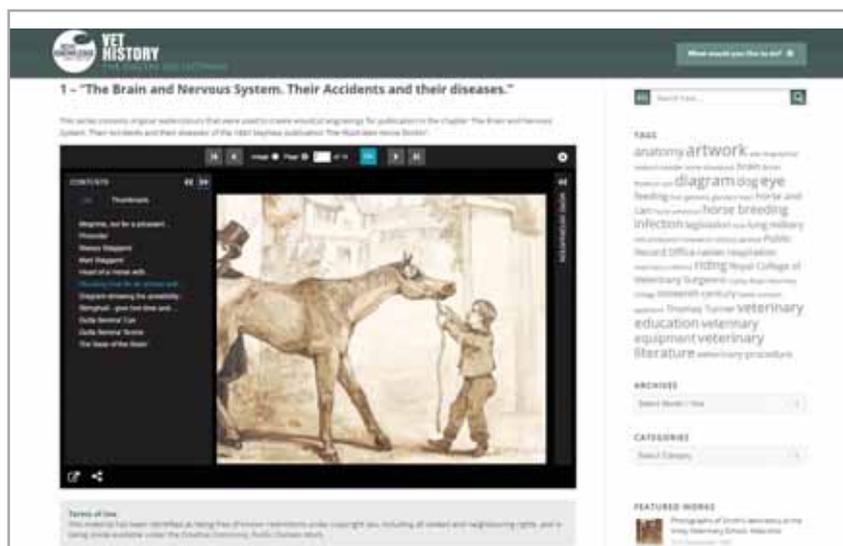
The Royal College of Veterinary Surgeons is unusual as it acts as regulator of the veterinary profession, as well as having more traditional Royal College functions. The Trust works to support the advancement of veterinary science through educational and research activities. The historical papers held at RCVS tell the story of the development of veterinary medicine and the profession from the late 18th century to the present. This includes material relating to



Watercolour from the collection of illustrations by Edward Mayhew, c.1860, depicting horse anatomy, pathology and veterinary treatment. (EM/113/27)



Photograph of Major-General Sir Frederick Smith's laboratory at the Army Veterinary School, Aldershot. Smith's papers contain notes and sketches of the many experiments, treatments and post-mortem examinations he carried out during his eight years at Aldershot (1886-1894) (FS/2/1/1/2), Crown copyright



“The historical papers tell the story of the development of veterinary medicine from the late 18th century”

Screenshot from the forthcoming Digital Collections website featuring the Universal Viewer application, copyright RCVS Knowledge

major changes in practice and legislation, but also records of daily practice by vets over the last 200 years. Additionally, there are deposited collections by individual vets from a broad variety of contexts, including female vets working in the pharmaceutical industry and for the Veterinary Investigation Service (now part of the Animal and Plant Health Agency).

The first collection catalogued is the papers of Major-General Sir Frederick Smith (1857-1929). Smith worked as a veterinarian for the Armed Services in India and South Africa and taught at the Army Veterinary School in Aldershot. He rose through the ranks and was Director-General of the Army Veterinary Department from 1907 to 1910. He kept extensive records of his practical and research work, and used his experience to write several books and numerous articles on horse anatomy and pathology.

Whilst we are already an established starting point for researchers interested in the history of veterinary medicine, I am keen to attract new research groups who can use the material we hold to gain a new perspective on other broad areas of study, such as military history. Smith’s official war diary and personal correspondence from the Second Anglo-Boer War provide a fascinating front-line account of a conflict rarely discussed in popular culture. He was immensely frustrated by the failings of existing veterinary practice and military doctrine, and worked hard to instigate change and improve the treatment of horses by the armed services.

In addition to the online catalogue, we will be launching a new Digital Collections website this spring. My objective with the digital collections site was to ensure that the content was easily seen within its archive context, with a hierarchical structure, and full descriptions. After struggling to find suitable proprietary software, which wasn’t designed for simple web gallery display, or was designed for much larger institutions, I turned to an open-source solution (Universal Player), and commissioned Digirati, the developers of the UV, to adapt it to suit our specific needs.

The final result enables researchers to quickly browse through lots of content, and make connections between related material, whilst also keeping sight of how each item fits within the whole collection. I also wanted to encourage engagement with veterinary professionals who can bring their specialist knowledge to the project. Therefore, the site allows for visitors to suggest their own tags, and join in discussion for each work displayed. The Digital Collections can then become an active hub for interaction between veterinarians, historians and the general public eager to learn more about the fascinating past of the profession.

Lorna Cahill

Royal College of Veterinary Surgeons Trust
(RCVS Knowledge)

Images supplied courtesy of RCVS Knowledge (Royal College of Veterinary Surgeons). Unless otherwise stipulated.

An Archivist in the Lab

Anne-Flore Laloë reflects on how the recent establishment of an archive has prompted a look at the relationship between archivists and scientists.

In January 2015, the European Molecular Biology Laboratory (EMBL), an intergovernmental organization focusing on fundamental research, services and training in molecular biology, established its institutional archive (www.embl.org/archive). The Laboratory had celebrated its 40th anniversary the previous year, and during these four decades the fledgling field of molecular biology flourished into a major pillar of scientific endeavor, enabling researchers to understand the key processes underpinning life in increasingly intricate detail. As such, there was a rich history to capture, and EMBL's position as Europe's flagship laboratory for the life sciences puts it in a great place to archive these discoveries.

The genesis of the EMBL Archive goes back to a letter by Sydney Brenner and Richard Roberts, two Nobel laureates, published in *Nature* a decade ago.¹ Addressing themselves to their scientific colleagues, the authors write that, "Science is one of the greatest cultural achievements of humankind. And yet, (...) there is little systematic preservation of the workings of scientists." They finish by imploring that scientists "preserve their papers and donate them to institutions that are committed to making them freely accessible to scholars. Let's not wait until memories have faded and papers been discarded at the end of a career before deciding to save our heritage." This letter made an impression on EMBL alumnus Giulio Superti-Furga who, together with the EMBL Alumni Association (of which he was then chair), worked to establish the EMBL Archive to share and preserve the Laboratory's scientific and institutional heritage.

The establishment of the EMBL Archive is still ongoing and I am EMBL's first archivist! Over the past two years, several milestones have been reached: writing the terms of reference, selecting software, establishing procedures, ensuring adequate storage space, communicating with staff across EMBL's five campuses in Cambridge, Grenoble, Hamburg, Heidelberg and Rome, and much more besides. But finding a way to support and inspire scientists to follow Brenner and

Roberts' advice remains one of the biggest, yet most rewarding, challenges. Because, reading his letter as an archivist, my immediate thoughts are: "At what time should I knock on the laboratory door with a trolley full of acid-free boxes? What is the place of the archivist in the scientific process?"

To think about these questions the EMBL Archive hosted a workshop on scientific archives in November 2016, bringing together 40 archivists from eight countries to discuss how to best capture, preserve and share current scientific material.

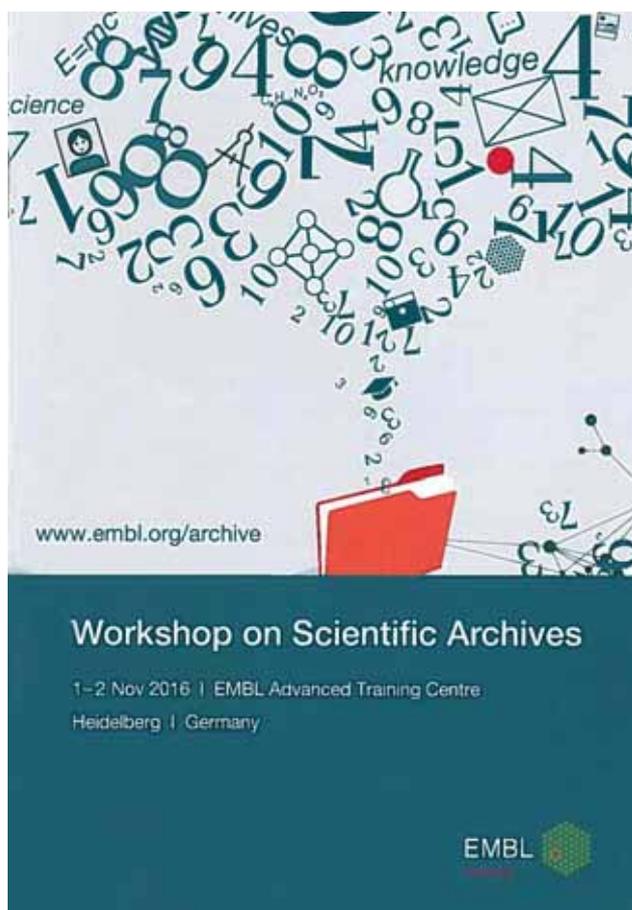
The workshop's sessions were:

- *Practical Archiving* - practical issues linked to cataloguing and making accessible collections whose content and origins are complex;
- *Acquiring collections (two sessions)*;
- *Keynote Lectures I and II*;
- *Roundtable discussion with scientists* - the archivist-scientist relationship during a scientist's career;
- *Engagement and outreach* - how archivists or their institutions can use archives for advocacy and outreach.

The two keynote addresses presented how collections are made and managed, and how different approaches to collecting can shape collections in the long-term. Jenny Shaw provided a wide-angle view from the Wellcome Trust and its consolidated and comprehensive world class collections pertaining to the history of medicine. Giulio Superti-Furga provided the point of view of a scientist. He advocated that scientists be more involved in archiving their work, encouraging his colleagues at the Research Center for Molecular Medicine (CeMM) of the Austrian Academy of Sciences to ensure that evidence of their successes and failures is recorded and preserved first in their own notes, and then in



A graphic promoting the EMBL Archive



Design for the poster for the workshop on scientific archives

Scientific Archives - Next meeting initiative under discussion: a meeting in the USA. Keeping up the momentum, Melanie Mueller, Director of the Niels Bohr Library and Archives American Institute of Physics, and Anne Barrett, Imperial College Archivist & Corporate Records Manager, are in early discussions with other interested parties about a Scientific Archives meeting to be held in the USA, possibly just prior to the Society of American Archivists Conference in Washington DC August 2018.

institutional archives. To encourage this, he has installed the CeMM Kapsel/Time Capsule, a “safe haven and repository for ideas and thoughts that are collected in writing in one of the 13,000 empty notebooks, with colored sleeves, shelved in an oval bookshelf embracing the entire small room.”²

A roundtable with EMBL scientists focused on what the working relationship between scientists and archivists can look like. One issue that emerged from this discussion is that when archivists speak of “preserving heritage”, this does not clearly translate into actions that a scientist can take in the laboratory. Bearing this in mind, the issue of how long it takes to archive better was addressed, culminating in Nick Goldman commenting that, “archiving is in fact an optimization problem.”³ It is clear that whatever processes archivists strive to insert in the scientific process will need to be as streamlined and natural to workflows as possible.

By bringing together archivists from all over the world with EMBL scientists, the workshop was an opportunity to question our current practices and look to ways of better embedding the idea and the practicalities of archiving into the scientific process. There is certainly room for these discussions to continue over time: the richness of experiences and ideas in both communities seem to be coming together just shy of a decade after Brenner and Roberts’ call to action. So, watch this space!

In the meantime, the EMBL Archive continues to establish itself. This year, cataloguing continues in earnest, and there is also the development of digital transfer and ingest workflows. And, to help researchers know the where, what and how of archiving, a ‘Laboratory to Archive Checklist’ is being prepared, with input from EMBL scientists. In the past 40 years molecular biology has acquired an incredible history. If we can spur our key protagonists into action we are now in a great position to capture and preserve the incredible stories hidden behind life science research.

Anne-Flore Laloë

European Molecular Biology Laboratory (EMBL)

Images supplied courtesy of EMBL/Manuela Beck

¹ S. Brenner and R.J. Roberts, “Save your notes, drafts and printouts: today’s work is tomorrow’s history”, *Nature*, 446 (2007), p. 725.

² “CeMM Kapsel/Time Capsule”, <http://cemm.at/cemm-kapseltime-capsule/> [accessed 20 January 2017].

³ Nick Goldman is an evolutionary biologist at EMBL-EBI. In a recent research project, he considered the question of data storage and archiving, and developed, with colleagues, a way of storing data on DNA. See: N. Goldman et al., (2013) “Towards practical, high-capacity, low-maintenance information storage in synthesized DNA”, *Nature*, 494 (2013), pp. 77-80, and Goldman’s TEDxPrague talk: “Where to store big data? In DNA”, <https://youtu.be/a4PiGWNsIEU> [accessed 20 January 2017].

Sir William Macewen and Modern Neuroscience: a surgeon ahead of his time

Matthew Weldon gives an undergraduate's perspective on using scientific archives.

In the final year of my neuroscience undergraduate degree, I was expected to undertake a project. In my case this took the form of an outreach project, in which I would try to engage the general public with modern day research on the brain and spinal cord. This brought me in contact with the University of Glasgow Archives and Special Collections.

Archives and Special Collections had recently been looking at the work of Sir William Macewen (1848-1924), as 2016 was the centenary year of Erskine, a hospital that Macewen helped establish. Macewen was an alumnus of the University of Glasgow, having graduated in 1869 with a medical degree. He made numerous medical contributions over the course of his extensive career, but perhaps his most daring contribution was to the science of surgery on the brain and spinal cord.

In 1879, Macewen was presented with a young patient called Barbara Watson, who had a tumour above her eye. Macewen had actually removed a tumour in the same place from the same person just one year previously, and was simply going to repeat the same surgery as before, but before he could Watson began convulsing. Macewen's conclusion was that some aspect of her brain was being affected, possibly by another tumour. Using a technique called cerebral localisation, Macewen drew upon the research of contemporary neuroscientists and calculated, based on Watson's symptoms, which area of her brain was being affected. He cut a section out of her skull and his hypothesis was confirmed - Watson had a brain tumour. He removed as much as he could, and Watson was soon restored to good health.



Delivering Hunterian Museum Insight talk, University of Glasgow Archives and Special Collections

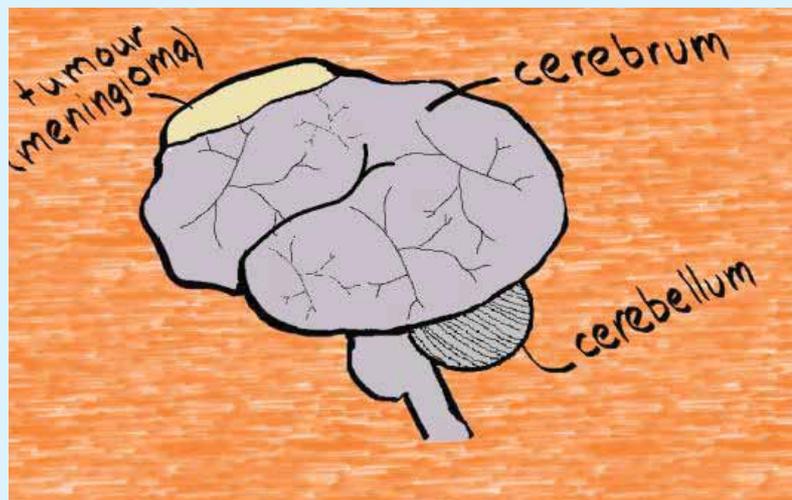
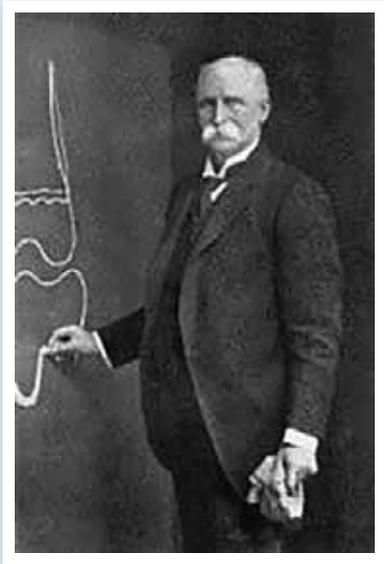


Illustration for blog on Macewen, copyright Matthew Weldon

This amazing case was my starting point when designing my project. The five kilometres of shelf space in the Archives and Special Collections store room holds many items relating to Macewen, including photographs of him and his work (he was keen to document his operations photographically), handwritten correspondence between Macewen and his family, and letters written to Macewen by another notable University of Glasgow alumnus, Joseph Lister. These resources were an excellent way to build up an idea of what Macewen was really like.

I also contacted other archives in Glasgow, visiting the Royal College of Physicians and Surgeons of Glasgow archive, as well as the NHS Greater Glasgow archive. In the former, I was able to consult Macewen's handwritten lecture notes on tumours, as well as his private journals. Here I was able to read his original account of his surgery on Barbara Watson (after I had deciphered his handwriting!). In the latter archive,



“I was able to read Macewen’s original account of his surgery - after I had deciphered his handwriting!”

Sir William Macewen, University of Glasgow Archives and Special Collections, DC 198

Macewen’s surgical log books were made available to me, which contained lists of the patients he’d seen and attended to.

I compiled my research into one document, along with information about modern methods of conducting the same kind of surgery, and used the research to fashion two different public engagement outputs. The first was a talk, which I presented to a crowd of 30 people in the Hunterian Museum at the University of Glasgow. The feedback collected afterwards was universally positive, and everyone who attended learned something new about Macewen. To reach and engage a wider audience, the same information was used to put together a blog post, for which I also drew some rough sketches to illustrate my point.

The making of a YouTube video or a podcast covering the same topic was discussed, but the frantic pace of a final year project didn’t allow for it on this occasion. In future, this sort of output would be ideal. The results of this project seemed to suggest that linking old and new research is a great way to educate the general public about contemporary research in science, so if undertaking another public engagement project in the future I would certainly look to make use of archives again.

Rachael Egan, Archivist, supervised Matthew’s work on Macewen for Glasgow University Archives and for this article. Matthew’s guest blog post on which this article is based can be found at <https://universityofglasgowlibrary.wordpress.com/2016/12/01/sir-william-macewen-and-modern-neuroscience/>

Matthew Weldon
University of Glasgow

Wikipedia edit-a-thons: using primary resources to enhance Wikipedia and provide outreach

Tom Rosko highlights how editing Wikipedia can be used as an opportunity to engage with new audiences.

Wikipedia is a resource utilized by millions of people as a source of authoritative information. The online encyclopedia, which relies upon the general community and individual editors, contains articles on seemingly every topic. Yet so much information is lacking. To help bolster content, ‘edit-a-thons’ are a way to address that issue.

The MIT (Massachusetts Institute of Technology) Libraries’ Institute Archives & Special Collections have participated in and hosted several edit-a-thons, utilizing

Image acknowledgement: <https://commons.wikimedia.org/wiki/User:Gkuriger>



our collections to spark interest in subjects and/or to provide content fodder, text or image, for the creation or enhancement of Wikipedia articles. To date we have hosted or participated in edit-a-thons on topics that include Women in Science and scientific rare books, among others.

Working with colleagues in the MIT Libraries and faculty from other parts of the university, including the writing program, Collections Archivist Greta Suiter along with Library Fellow Jessica Venlet took the lead in organizing the first of these events. The archivists identified general topics of interest in Wikipedia for which we had strengths in our collection, and organized the events based on subject.

A typical session may be a morning or afternoon, or all-day. For the edit-a-thons hosted by the Institute Archives & Special Collections, the session usually starts in the reading room with a review of archival research methods and of the potential sources to use. Materials from collections are on display and first, some time is spent looking through collections for inspiration. After this the session moves to a nearby classroom equipped with computers, though most bring laptops (the session could take place in one room, however our reading room is small and not well equipped for this). Next comes an introduction to the basics of Wikipedia editing, and registration as editors for those not yet registered. Then it's time to get to work, as editors seek out information and add to their articles. Snacks are provided to help keep the work moving along.

Most attendees have been very committed with most 'editors' staying the whole session and using the time well; others put in the time they can. Overall, we have viewed the sessions as very successful as they serve multiple purposes: enhancing the content of Wikipedia and bringing more awareness of archives and special collections.

Along with other outreach efforts - such as hosting 'Archives Roadshows' in which we bring some archival items out of the reading room and talk about what we have and what we do, or 'Special Collections Speed Dating' in which we have items on display and rotate guests from table to table for brief visits with some of our collections - Wikipedia edit-a-thons are yet another way to engage the use of archives and special collections in new and creative ways.

For more information: https://en.wikipedia.org/wiki/Wikipedia:How_to_run_an_edit-a-thon

Tom Rosko

Institute Archives & Special Collections, Massachusetts Institute of Technology



Editors at work:
<https://commons.wikimedia.org/wiki/User:Gkuriger>



Providing sustenance for the editors. Image acknowledgement:
<https://commons.wikimedia.org/wiki/User:Gkuriger>



Editors at work. Image acknowledgement:
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Finding the best of both worlds: bridging research and archives at ETH Zurich

Ana Sesartić and Marion Wullschleger discuss how to manage both analogue and digital data.

ETH Zurich, the leading research university in continental Europe, has a long tradition of preserving its valuable records and data for future generations.¹ In particular, the ETH Library provides professional archival services for unique analogue and digital material from the ETH's fields of research, teaching, and administration.

ETH Zurich University Archives

The ETH Zurich University Archives² were founded in 1999 and include the ETH Library's manuscript collection established in the 1940s. Today, it has about 4,000 shelf metres of analogue material. As ETH Zurich was among the early adopters of digital office and lab technology, the University Archives are increasingly faced with the processing of digital documents and data of historical value. According to their legal mandate for the long term preservation of administrative data, the University Archives use the digital infrastructure provided by the Digital Curation Office,³ while the archival description process is carried out by a team of professional archivists.

When it comes to research material, the University Archives and the Digital Curation Office have established a division of labour. The University Archives are in charge of the analogue material and the Digital Curation Office is in charge of the digital material. The ETH Library has long pursued a strategy of collecting



Das Polytechnikum 1865, later ETH Zurich, S. Zurlinden Hundert Jahre: Bilder aus der Geschichte der Stadt Zürich in der Zeit von 1814–1914 (1914), image available under Wikimedia Commons uploaded by Roland zh



ETH Zurich at twilight, image available under Creative Commons ETH Bibliotek

research material and personal papers from faculty and alumni as they constitute valuable sources for historical scientific research. Archivists are in regular contact with (retired) faculty in order to identify valuable scientific material and personal papers, which are then appraised, arranged, and professionally preserved. The University Archives regularly digitise and publish research material and historical private papers online on the platform e-manuscripta (www.e-manuscripta.ch). Furthermore, highlights from various collections are regularly published on the blog ETH heritage (<http://blogs.ethz.ch/digital-collections/>).

In the future, the University Archives might play a more central role in curating digital research data. Notably, the University Archives have decades of experience in handling copyright and data protection issues. This is especially relevant for unpublished research material or data whose owners are no longer at ETH Zurich.

Digital Curation Office

One of the Digital Curation Office's⁴ roles within the ETH Library is to provide a point of contact for technical and conceptual questions regarding long-term preservation and management of research data. As the management of research data throughout its life cycle is both a key prerequisite for effective data sharing and efficient long-term preservation, the Digital Curation Office also offers training and consulting services for researchers from early on in the data life cycle. This starts with general consulting regarding compliance and support during creation of data management plans. It continues with the offer of data archiving at the ETH Data Archive⁵ and publication services as well as the creation of DOIs⁶ for easier citation and re-use of data. In order to cover the entire data life cycle, the ETH Library is also collaborating with ETH Zurich's Scientific IT-Services⁷, which offers IT-services and tools like ELN/LIMS⁸ to the researchers for handling data mainly during the active research phase.

The significance of research data management is steadily increasing for researchers and funders as well as in curricula and good scientific practice, as stated in ETH Zurich's Guidelines for Research Integrity.⁹ The ETH Library collaborates with the Technology Transfer Office¹⁰ and the Office of Research¹¹ regarding intellectual property and research ethics issues respectively.

With the growing digitisation of science and society, a curation gap¹² is opening between research practice and curation needs. The ETH Library is striving to intensify collaborations with new generations of researchers in order to promote a mutual learning process, tackle new challenges and close this gap. For a technical university like ETH Zurich, it is especially useful to have staff with a background in science in order to strengthen the ties between archives and research.

Pointers for the future: interdisciplinary cooperation

Analogue and digital archivists face similar challenges: research data, records, and private papers are often managed poorly and lack a stringent system or coherent metadata to understand their context. It is thus imperative to bridge archives and research by:

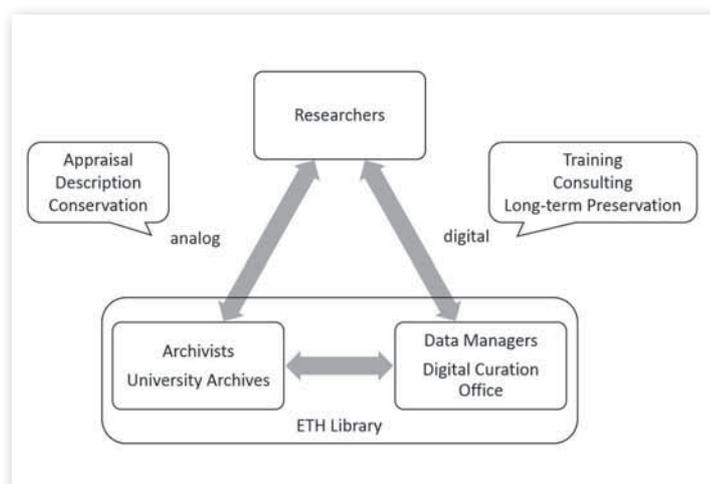


Figure 1 - Interactions between different actors across the disciplines

- providing training to researchers to improve data and records management.
- providing workable management practices both for data and documents.
- raising awareness among university staff and researchers in general (e.g. through colloquia).

It is important for information professionals within an organisation to know each other's services and areas of expertise in order to be able to refer researchers to the right contact person. Hybrid research material (i.e. both analogue and digital) will continue to be the norm for decades to come.

From our own personal professional experience at ETH Zurich, we believe that close cooperation across the disciplines (cf. figure 1), from scientists to archivists, data curators, records managers, and IT-specialists, will yield the best results for preserving scientific and cultural heritage for generations to come.

Ana Sesartić and Marion Wullschlegler

ETH Library, ETH Zurich

¹ For an overview of ETH Zurich's diverse landscape of archives and special collections see <https://www.ethz.ch/collections-archives>.

² <http://www.library.ethz.ch/en/Resources/Archival-holdings-documentations/ETH-Zurich-University-Archives>

³ C.J. Huber, "Digitale Langzeitarchivierung im Hochschularchiv der ETH Zürich – Eine Herausforderung für das Archivmanagement" in B. Rehse and Irina Schwab, eds., *Archivmanagement: Ressourcen nutzen, Potentiale erkennen. Frühjahrstagung der Fachgruppe 8 im Verband deutscher Archivarinnen und Archivare e.V.* (2015, Leipzig), pp. 44-52.

⁴ <http://www.library.ethz.ch/Digital-Curation>

⁵ <http://data-archive.ethz.ch>

⁶ <http://www.library.ethz.ch/DOI-Desk-EN>

⁷ <https://sis.id.ethz.ch/>

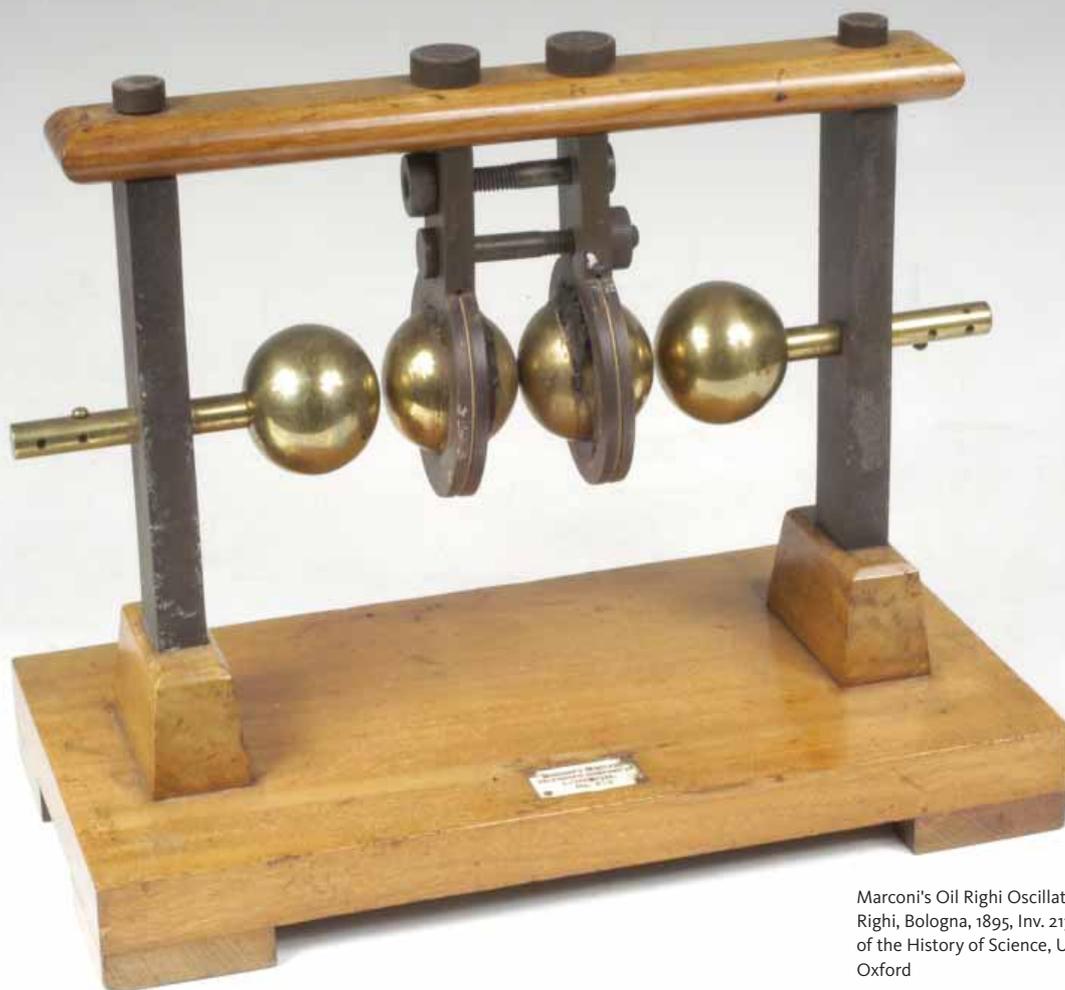
⁸ <https://openbis-eln-lims.ethz.ch/>

⁹ https://www.ethz.ch/content/dam/ethz/special-interest/itet/departement/Studies/ETH_Research_Integrity_2011.pdf

¹⁰ <http://transfer.ethz.ch>

¹¹ <https://www.ethz.ch/en/the-eth-zurich/organisation/staff-units/office-of-research.html>

¹² See A. Sesartić et al. in *ISPRS Int. J. Geo-Inf.*, 5, 6 (2016), p. 91; doi: 10.3390/ijgi5060091.



Marconi's Oil Righi Oscillator, by Augusto Righi, Bologna, 1895, Inv. 21300. © Museum of the History of Science, University of Oxford

Guglielmo Marconi: a world of archival heritage¹

Giovanni Paoloni considers the complex archival survival of records relating to the famous inventor.

In September 2016, Oxford University Press published *La biography of Guglielmo Marconi*, written by Marc Raboy,² which will be for years to come the standard academic reference biography of the inventor of wireless and radio. The biography is based on extensive and accurate use of archival sources, partly already known and available, partly previously unknown or unused.

As with other great personalities, the archival heritage of Marconi is wide and varied, for origin and scope, and new findings are added periodically to the already known material. An accurate census of Marconian archives is online on the website of the Fondazione Marconi, in

Pontecchio (Bologna).³ At present, the major documentary cores are in Oxford, at the Bodleian Library, and in Rome, at the Accademia Nazionale dei Lincei.

In Rome are the records related to training and early experiments, including correspondence between Marconi's parents and some laboratory notebooks, discovered by this author in the early nineties.⁴ The Marconi archives from 1896 to the 1930s are in Oxford:⁵ the corporate records of the Marconi Company are intertwined with the inventor's personal papers, as the company was the pivot of his life. At a certain moment, Marconi also assembled there the documents (including

some that very likely were originally kept on the family estate, in Bologna) he considered fundamental to establish his version of the history of wireless, substantially coinciding with his own biography.⁶

Other Marconi papers of the 1930s, mainly focused on his role as president of the Accademia d'Italia, are in Rome, where his last personal secretary, Umberto Di Marco, kept them.⁷ Other important family archival materials are preserved by Marconi heirs: Raboy had the opportunity to use those held by Francesco Paresce, in Bologna, and Michael Braga, in Sarasota, Florida, whereas it is unclear what is kept by Marconi's youngest daughter, Elettra. Beyond these archives, that are a product of Marconi's activity, personal or through the companies and institutions where he was involved, other Marconi-connected records are obviously kept in the archives of companies and institutions he was in contact with, or held by collectors or cultural heritage institutions, private or public. In addition, digitized records are available in the Fondazione Marconi and "Marconi Calling" websites. A list of these materials would not only be very long, but should be periodically updated with new findings.

The potential interest of the historical heritage related to Marconi lies not only in its contents, but also in the number of challenges it poses to librarians, archivists and museum curators. The wide range of documentary materials comprises: traditional records, books, advertising, press cuttings, other non-book materials, photographs and audiovisual records. Their history is intertwined with instruments and other museum holdings, partly originals, partly historical replicas, held in Oxford, in the Museum of History of Science, where they came along with the Marconi Archives; in Milan, in the Museo nazionale della scienza e della tecnologia "Leonardo da Vinci"; and in Pontecchio, in the Museo della Fondazione Marconi in Villa Griffone.

They document, on one hand, the origin and development of wireless by Marconi and his companies, on the other, the early museumization of wireless history, started when Marconi was still alive. Unfortunately missing is the yacht *Elettra*: a floating laboratory with a major role in the development of the "beam system", and later the stage of the social life of Marconi and his second wife. Damaged after World War II, it was impossible to restore; its hull, cut in different pieces, is now located in symbolic Marconi places, one of them in the garden of Villa Griffone.



'Melba' Telephone Microphone No C100L, by Marconi Company, English, 1920, Inv. 54651. © Museum of the History of Science, University of Oxford



Marconi Crystal Receiver with Valve, by Marconi Company, London, c. 1916, Inv. 99012. © Museum of the History of Science, University of Oxford

Cultural Blockchain



Grasshopper Send-Receive Morse Key, by Marconi Company, English, c. 1899, Inv. 79280. © Museum of the History of Science, University of Oxford

This variety of documents (including museum holdings) is a potential experimental field for new standards and conceptual instruments in cultural heritage cataloguing. Developments are producing groundbreaking research in the domain of the so-called “digital humanities”, involving archivists, librarians, museum curators, and data scientists. After inventing wireless at the turn of the 20th century, and after shaping, in the 1920s, telecommunications and radio in the way we now know them, in the 21st century Marconi can still inspire, through his heritage, the development of cultural infrastructure and services.

Giovanni Paoloni

Università ‘La Sapienza’, Roma and Scientific Board of Fondazione Marconi, Pontecchio Marconi (Bologna)

¹ This paper is part of a research programme in the Marconi Archives, Bodleian Library, Oxford, supported by a Byrne-Bussey Marconi Fellowship, awarded to the author in the spring 2016 to study the relationship of Marconi with Italy.

² M. Raboy, Marconi. *The Man who Connected the World* (Oxford, 2016).

³ <http://www.fgm.it/it/archivio.html>

⁴ They are at present at the Accademia Nazionale dei Lincei; their history can be found in the Fondazione Marconi website (see above, n. 3), and their description is given in the Accademia dei Lincei website (see beyond, n. 7).

⁵ The Marconi Archives in Oxford, donated to the Bodleian Library in 2004, have been catalogued by Michael J. Hughes (<http://www.bodleian.ox.ac.uk/dept/scwmss/wmss/online/modern/marconi/marconi.html>).

⁶ They constitute the ‘historical’ section created in the Company Archives after Marconi’s death (392 of 4,027 boxes) to which must be added approx. 200 boxes of company records of the years when Marconi was a leading figure. However, the Marconi Archives include not only the records of companies of Marconi’s own time, but also companies of the later Marconi group: the English Electric Company Ltd., the Metropolitan-Vickers Electrical Company Ltd., the British Thomson-Houston Company Ltd., Associated Electrical Industries Ltd., the General Electric Company plc and other associated companies. The Marconi Archives are therefore a major archival source for the industrial history of Britain, well beyond Marconi himself (Raboy, 2016, pp. 659-660, 670-673).

⁷ These archives were donated to the Accademia dei Lincei by Giovanni Battista Marini Bettolo, a leading Italian chemist and heir of Umberto Di Marco, in 1974, on the occasion of the centenary celebrations of Marconi’s birth. They were first catalogued by this author in 1993-1996; a new catalogue has been prepared by Luca Tosin in 2014 (http://www.lincci.it/files/archivio/Archivio_Guglielmo_Marconi_09-2014.pdf). Marini Bettolo also donated some Marconian records to the Accademia Nazionale delle Scienze, detta dei XL.

The Centre for Scientific Archives’ Chairman, Anne Barrett, and Geoff Browell (Head of Archive Services at King’s College London) are exploring the uses of Distributed Ledger Technology (DLT) in the Galleries, Libraries, Archives and Museums (GLAM) sector, and among scholarly communities and knowledge professionals. Conversations and a workshop have been conducted with King’s College London Digital Lab (Director, James Smithies), the University of Sussex Humanities Lab, Sussex Creative Technology Group in the Department of Informatics Computer Science at Sussex, and the Centre for Scientific Archives. Michael Mainelli from the commercial firm Y/Zen has also provided valuable input.

DLT, otherwise known as Blockchain, underpins financial transactions. This methodology could be translated to the cultural sector as a verification system and much more. Cultural DLT could provide the next-generation technology required to enable radical new forms of co-creation, value capture, and storytelling, at the same time as it returns the cultural/arts sector to levels of quality assurance and sustainability not seen since the twentieth century.

Investigation is underway of a research and public engagement project which will explore the potential to the cultural/arts sector of DLT. Archives and the ideas they bring forth - the debates, dialogues and cultural conversations that are the stuff of intellectual enquiry - are generally regarded as long lasting, even immutable, but this is not true: instead they decay and are lost in time. This research project will seek new ways of preserving the digital record by creating a permanent escrow of a cross section of human thought. In doing so the project will define cases for preservation and reuse, explore ethical, licensing, and legal issues, and report on the potential of DLT for the cultural/arts sector.

This research is at the early stages, so again watch this space!

Geoff Browell and Anne Barrett

King’s College London and
The Centre for Scientific Archives

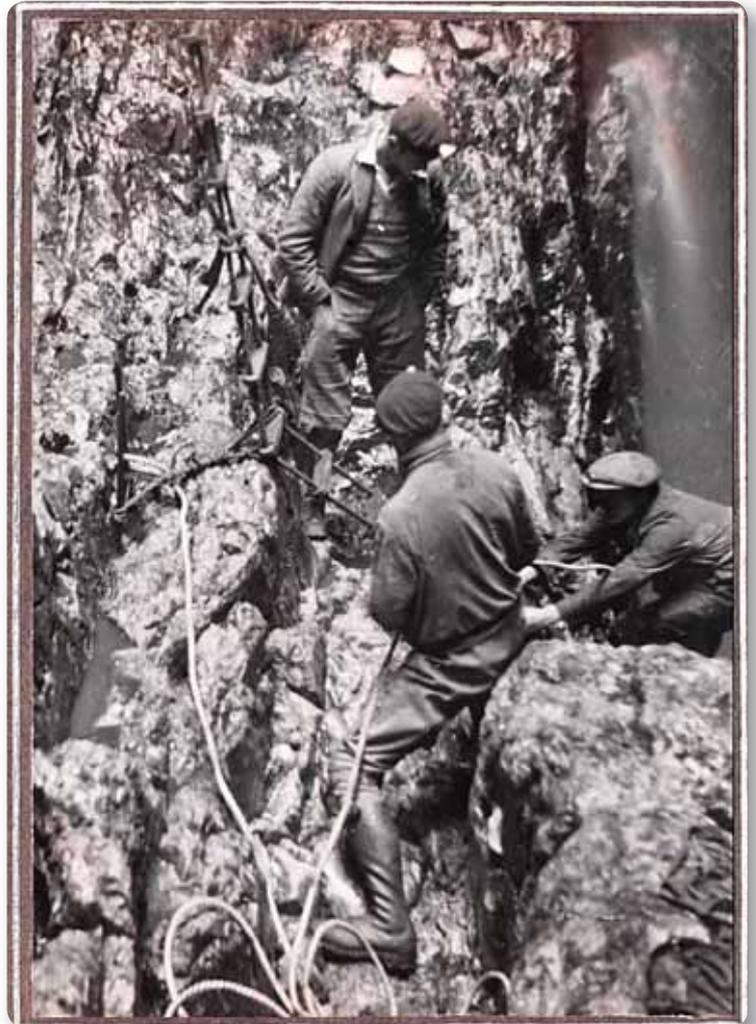
The National Geoscience Data Centre and National Geological Repository: a different sort of archive!

Rod Bowie highlights an archive with a long history of supporting scientific endeavours.

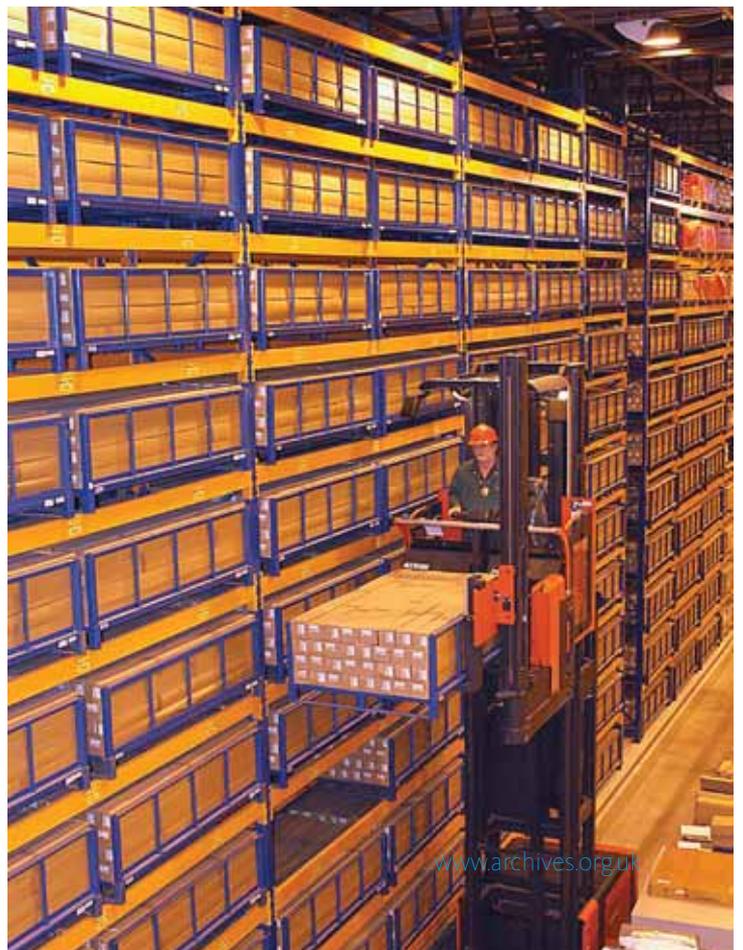
The **British Geological Survey (BGS)** has a history stretching back to the creation of the Geological Survey in 1835. It has statutory powers to carry out surveys and research and is required to keep records of this work as a Public Records Body. However it also acts more generally as a national centre for the collection and preservation of geoscientific and earth science information.

This unique archive is of national importance and has been created over the past two and a half centuries. It covers both the UK and overseas and now contains tens of millions of physical specimens, reports, documents and other items in digital and analogue format. These collections continue to grow rapidly through data collected by BGS staff, deposits by industry and academia and data deposited under Natural Environments Research Council (NERC) data policy. The collection includes data that have been obtained under various legislation and statutory rights and also information deposited voluntarily by external

Part of the NGR material collections



Descending the Alum Pot (over 100 metres deep), 1931, Hayward Archive BCRA, image by permission of the British Cave Research Association

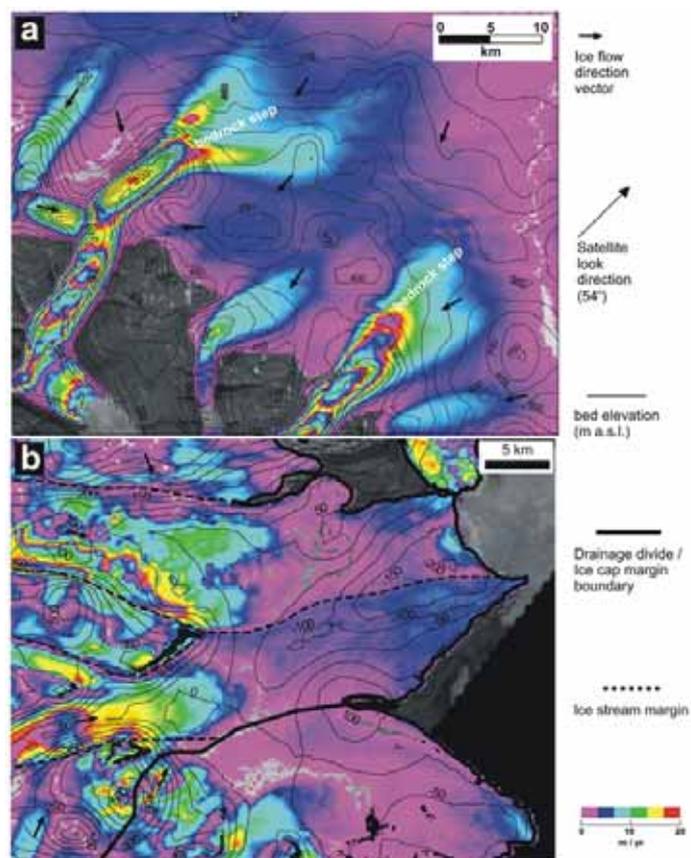




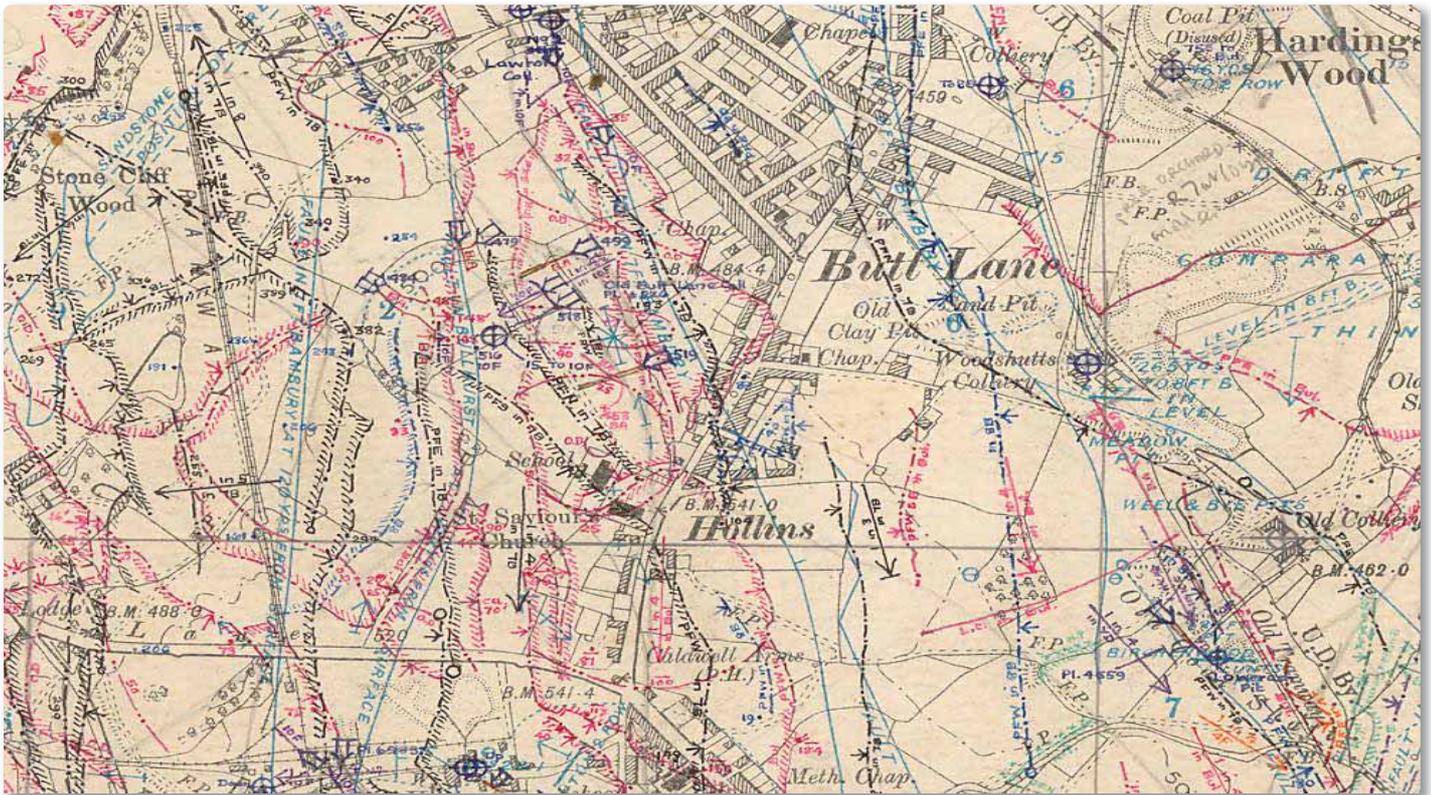
Students from Imperial College using the NGR core examination facilities parties. The centres at Keyworth and Edinburgh are recognised ‘Places of Deposit’ with the right to retain Public Records

The collections are therefore a valuable resource that is used by the BGS and a wide variety of academic and commercial researchers. The records contain a wealth of data from detailed geological field observations and land-use information, papers and reports through to laboratory test results, fossils, computer algorithms and models. These are just examples of the wide range of scientific information in the archives. New methods make online submission of digital information easy and once it is ingested it can be made available immediately, where terms and conditions allow.

Science depends on reproducibility; the archives enable researchers to go back to the original data and confirm or refute previous conclusions. As data is often extremely expensive or difficult to collect (e.g. oil well cores), the archive minimises the need to collect new data, reduces risk and can make otherwise non-viable projects viable.



Example of a digital map of ice sheets from a NERC funded Research Programme



Field map showing mining activity - shafts, adits and underground workings in Staffordshire by FW Cope 1940

Originally used as an aid to production of the geological map, the collections now provide information for a wide variety of uses including environmental assessments, safety, planning and research. Data can be re-used and repurposed for research and commercial exploitation. Much of the archive is now available on-line or through mobile apps.

The BGS manages the archives through two main components:

The National Geological Data Centre (NGDC) is the NERC Environmental Data Centre (EDC) for Earth Sciences. It deals with all the corporate digital output from the scientific work carried out by BGS and also the digital earth science data resulting from research funded by NERC, and carried out in other research institutes and commercial organisations, both in the UK and abroad. To date NERC has funded £330m of research in the Earth Sciences. The output from this research is a valuable resource that can be re-purposed and re-used by current and future researchers. See <http://www.bgs.ac.uk/services/ngdc/home.html>

As part of its EDC role the NGDC:

- liaises with principal investigators and researchers to ensure that proper planning and management of their scientific information is carried

out both at the start and throughout the life of their projects and that the outputs from their research are offered to the NGDC;

- selects data for inclusion in the NGDC archive in liaison with scientists and other stakeholders, in accordance with its Data Collection Policy and Data Value checklist;
- provides long-term curation and preservation of analogue and digital data (including samples - see below);
- publicises the holdings and makes the information available on the web.

The National Geological Repository (NGR) manages the archive of all the materials collections and born analogue information, records and data created by BGS and other research and commercial organisations as well as any physical output from NERC Funded academic research. The NGR also includes our Library Service and the BGS Archive. See: <http://www.bgs.ac.uk/data/NGR/home.html>

The collections include information and materials from onshore and offshore boreholes, fossils, rocks, minerals etc. These collections enable the study of materials which may well be unique or unavailable elsewhere,

“*The archives enable researchers to go back to the original data and confirm or refute previous conclusions*”

through cost, or difficulty of access. The records, for example, contain the information gathered as part of the organisation's survey work including 70,000 field maps and geologists' notebooks dating back to the 1840s. Another example is the results of a 30 year UK wide programme to carry out geochemical analyses of stream water and sediments which was originally for finding minerals, but is also now used as a baseline for health and the environment. See: <http://www.bgs.ac.uk/opengeoscience/imagesAndScans.html>

The BGS is progressively scanning and digitising the NGR collections, and many of these are now freely available online. Examples include over 1 million scanned UK onshore borehole records, and 125,000 high-definition images of cores from UK continental shelf hydrocarbon exploration and production wells and innovations such as the project with JISC to produce high resolution photographs and 3D models of the type specimens of GB fossils.

See: <http://www.3d-fossils.ac.uk/home.html>

The BGS Archive holds material from the BGS and its precursors and the Overseas Geological Survey and Imperial Institute and also archives from organisations such as the British Cave Research Association. The Archive principally contains:

- administrative records of BGS and its predecessors, covering both UK and overseas operations
- personal papers of BGS staff and other individuals associated with BGS and individuals or groups in related fields.

An online catalogue provides access to information within the archives. BGS Archives - Online catalogue

Rod Bowie

British Geological Survey

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‘Discriminating Fossils’: a case study

Jane Insley demonstrates the value of utilising a variety of archive, library and museum resources.

Preparing James Watt’s garret workshop for redisplay in the Science Museum in 2011 required a close examination of all its contents and a review of the stories that could be told. Watt, the Scottish engineer responsible for kick-starting the industrialisation of Britain at the end of the 18th century, had built a retirement home for himself and his family at Heathfield, near Birmingham. The garret, two floors above the kitchen, was a place where he could carry out experiments, and store the tools, materials and artefacts from a lifetime of engineering and scientific research.

On a bench in the middle of the room was an ordinary mahogany box, containing “219 boxwood prisms”, according to the inventory assembled by the house agent, Mr Collins,

Crystal models being sorted according to Loscher's plates by volunteer Valerie MacAthern



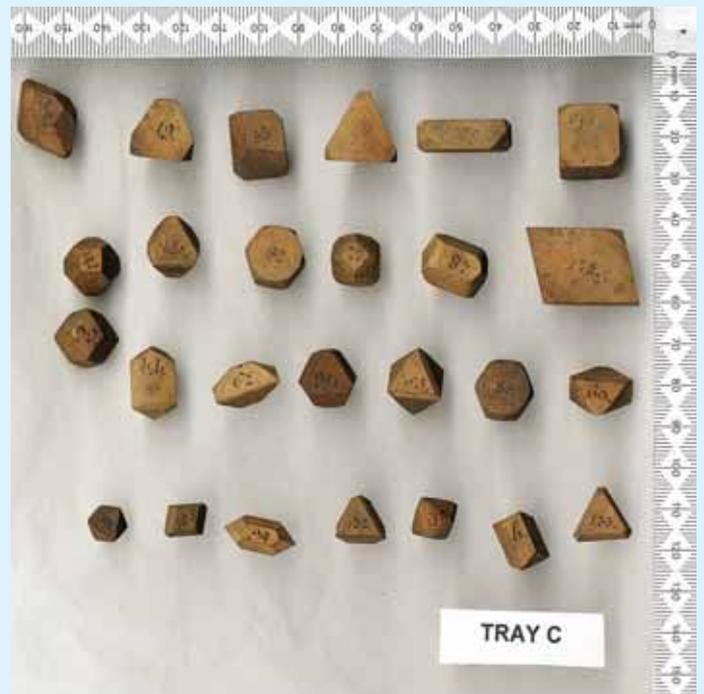


James Watt's box of geometric crystal models in the Watt Workshop at the Science Museum

in 1886. Collins had no idea what he was looking at, but methodically noted the contents of each piece of furniture; as a result, we could re-position them with confidence. But what were these prisms?

An enthusiastic volunteer, Valerie MacAthern, offered to scan each one individually, marking side downwards - a time-consuming but essential first step in attempting to identify them. This showed the models were marked in a variety of distinctive ways ('a', 'b', 'c'...; 'aa', 'bb', 'cc'...); when these were set aside, the remainder had a single run of numbers from 1 to 200. My own knowledge of 18th century mineralogy being roughly the same as Mr Collins's, I decided to search for a text with illustrative plates with images to match.

Tribute must be paid to the monumental catalogue of the Boulton and Watt Archive holdings at the City of Birmingham Library. Eleven paperbacks formed the initial guide; in a miscellaneous listing of miscellaneous papers was a reference to a "Description of crystal models". The Science Museum Library had a microfilm of the archive; this manuscript had a distinctive title, and



A sample tray of geometric crystal models

hinted at the author's name - Werner. The librarians at the Mineralogy Library at the Natural History Museum next door found a copy of a book by Carl Immanuel Loscher,



James Watt exhibition at the Science Museum, 2011

assistant to Werner, from 1796, with plates that matched the lettered models. A Google search found a second volume from 1801, with images matching the models, but not the numbering. However, the manuscript matched the model descriptions and the numbers, suggesting that it pre-dated 1801. So who was the owner?

James Watt's elder son, James Jnr, had been sent on an industrial equivalent of the Grand Tour, and spent time at Freiberg studying with Werner. He wrote enthusiastically home about the exciting methods of identifying minerals from their crystal shapes; James Snr, in reply, remarked:

Birmingham, May 7th 1787

I am glad to hear you are making such progress in your mathematics. As to Mr Werner's classification of minerals, though it may be proper for you to know it, yet I cannot conceive of it to be of much consequence to you, as the chemical analysis is the only sure method of discriminating fossils, and is abundantly more simple than any other and must be reverted to in the long run, at least for all fossils that admit of it. That of the external characteristics has a few partisans in France, but none that I know of here.

“An enthusiastic volunteer offered to scan each prism”

This little vignette combining science, history, manuscript, archive, library and museum sources, could only be produced through the skill and determination of experienced guardians of our cultural heritage.

For more information, see: J. Insley, “Discriminating Fossils - the crystal models belonging to the Watt family, 1790 -1819”, *Bulletin of the Scientific Instrument Society*, 111 (2011), pp. 2 – 5

Jane Insley

UCL Institute of Education, London
(Retired Senior Curator of Engineering, Science Museum, London)

Images: author's own

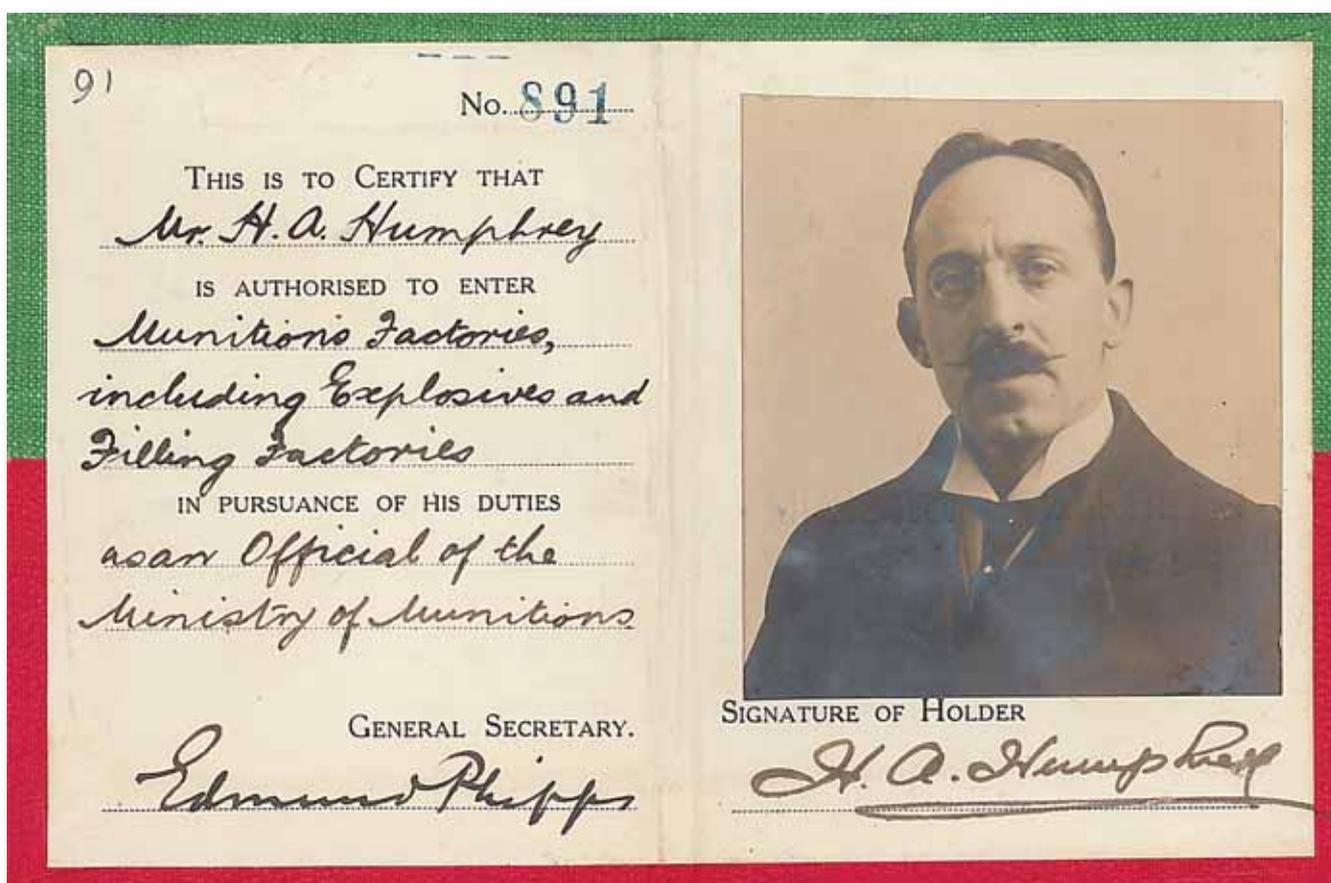
Imperial science and technology: a tale of two collections - a scientist, an engineer and their relevance to British industry

Anthony Travis discusses what the papers of two notable scientists can tell us about their lives and work.

The papers of the scientist Raphael Meldola (1849-1915) and the engineer Herbert Alfred Humphrey (1868-1951) have a lot to say about cutting edge developments in science and technology in Imperial Britain between 1860 and 1930. Both men were intimately engaged with a cornucopia of endeavours: Meldola with evolution, structural and synthetic carbon (organic) chemistry, and the synthetic dye industry; and

Humphrey with the gas industry, a novel pump, modern explosives, high-pressure chemistry, and electricity generation. What is more, their careers are remarkably complementary, particularly as they relate to chemical technology. I would like to highlight the significance of the two collections, and emphasize their roles in preserving the means to reconstruct the histories of two closely linked sectors of British industry. By chance

H. A. Humphrey Ministry of Munitions ID card



and design, respectively, their papers are safely held with the Imperial College Archives and Corporate Records Unit.

Raphael Meldola

Raphael Meldola made his reputation as an industrial chemist, educator, and keen naturalist. During 1866-1868, he studied chemistry at London's Royal School of Mines. In 1871, he joined the first science-based industry, that of synthetic, or coal tar, dyestuffs. He then left industry, in 1885, to become professor of chemistry at Finsbury Technical College. From that time Meldola warned of the danger to Britain of the neglect of technical education, giving as an example the tremendous growth of the synthetic dye industry in Germany. In 1906 as president of the Chemical Society he was responsible for the fiftieth anniversary celebrations for the discovery of mauve, an event which also served to emphasize how far Britain had fallen behind Germany in science and technology. Little notice was taken, at least until the outbreak of the Great War in 1914. Then Meldola served his country through the organisation of science. The effort broke his health and he died late in 1915.

Herbert A. Humphrey

The great challenge for the historian interested in recording Humphrey's career lies in the loss many years ago of most of his papers. The remnants were, fortunately, given by his son, Dr J. Humphrey, FRS, to Imperial Archives in 1970. What happened to the rest? The answer we find is in a letter that Humphrey penned in 1949: "All my data and records, and the contents of box files occupying 36 feet of shelves, all my drawings and 100 volumes of my private diary, have been burnt in an incinerator. It took my gardener 3 weeks to do all the job." What the neighbours in Royal Tunbridge Wells had to say about the daily emission of smoke from the incinerator is not recorded. While the loss to the historian is great, especially bearing in mind Humphrey's range of activities, sufficient remains for us to piece together a record of his career, which parallels changes taking place in British industry from the last decade of the 19th century until the early 1930s. Humphrey investigated new and competing technical innovations; he also adjusted smoothly to the requirements of civil engineering, chemical engineering, and electrical engineering.



Portrait of Raphael Meldola

Herbert A. Humphrey studied civil and mechanical engineering from 1885 at London's Central Institution, one of the forerunners of Imperial College. In 1901, after a dozen years in employment, at first in the iron industry and then in chemical manufacture, he branched out on his own as a consulting engineer. Semi-independence

Bradford Engineering Society.

SYLLABUS—13TH SESSION, 1911-12.

Date	Subject	Speaker
1911 Oct. 16	Opening Meeting—Conversations	
Oct. 30	"Humphrey Pumps and Compressors" ..	H. A. HUMPHREY, Esq., M.I.C.E., M.I.MECH.E. (London).
Nov. 13	"The Diesel Oil Engine"	CHARLES DAV, Esq., Wh. Sc. (Stockport).
Nov 27	"What transpires inside a Steam Boiler at work" (with experiments, models, and illustrations)	ARTHUR ROSS, Esq (London).
Dec. 11	"The Use of Exhaust Steam"	C. S. RICHARDS, Esq., B.Sc. (Manchester).
1912 Jan. 15	Annual Dinner	
Jan. 29	"Present Tendency in Steam Engine Design"	PROF. G. F. CHARNOCK, A.M.I.C.E., M.I.MECH.E.
Feb. 12	"The Measurement of High Temperatures"	R. S. WHIFFLE, Esq. (Cambridge).
Feb. 26	Visit to the New Power House, Technical College	
Mar. 11	Annual General Meeting and Smoking Concert	

MONDAY EVENINGS AT 7-45 PROMPT.

Members are requested to preserve this Syllabus as it may be the only notification of Meetings.

The University
of Liverpool

Engineering Society.

RESERVED.

OPEN MEETING.

A LECTURE by H. A. HUMPHREY, M. Inst. C.E.,
ON
"Types of Humphrey Pumps and Compressors,"

WALKER ENGINEERING LABORATORIES,
WILL BE GIVEN IN
ON **TUESDAY, 20th FEBRUARY, 1912.**

Inspection of Laboratories - 6-45 pm.
Lecture - 8.0 pm.
Refreshments - 9.15 pm.
TICKETS MUST BE PRESENTED AT DOOR.

The University of Liverpool

ENGINEERING SOCIETY

SESSION 1911-1912.

PRESIDENT.
E. L. V. DAVIS.

HON. PRESIDENTS.
FROM E. W. MARGHANT, M.I.C.E., M.I.MECH.E.
FROM W. H. WATKINSON, M.I.C.E., M.I.MECH.E.
FROM S. W. PERROTT, M.A.I., M. Inst. C.E.
FROM W. S. ABELL, F.R.S.E., M. Inst. N.A.

VICE-PRESIDENTS.
C. J. ROBINSON.

HON. VICE-PRESIDENTS.
FROM J. A. P. ASPINALL, M. Inst. C.E.
FROM J. HENDERSON, M. Inst. C.E.
FROM J. HONNOLLY HOLLANDER, M. Inst. C.E.
FROM K. S. CAREY, M.A.
FROM L. R. WILBERFORCE, M.A.
FROM J. WEAVER'S ANDERSON, M. Inst. C.E.
FROM J. WINDON, M.I.C.E., Assoc. M. Inst. C.E.
FROM J. D. HARRIS, M. Inst. C.E.
FROM G. E. SCOTLAND, M. Sc.
FROM J. K. CATTERSON-SMITH, A.M.I.E.E.

HON. TREASURERS.
E. P. COSTON, B.Sc., B. Eng. W. D. LEVY-SHAW.

HON. SECRETARIES.
P. L. JONES, B.Sc. T. E. N. YARGER, B. Eng.
TELEPHONE 621 ROYAL.

Manchester University.

Engineering Department.

SPECIAL

SHORT COURSES OF LECTURES

I. DESIGN OF STEAM TURBINE.
By GERALD STONEY, B.E., F.R.S.,
M. Inst. C.E.

II. COAST EROSION & COAST PROTECTION.
By ERNEST R. MATTHEWS, A.M.I.C.E.,
F.R.S.E.

III. THE NEW PRINCIPLES INVOLVED IN
THE HUMPHREY PUMP.
By H. A. HUMPHREY, M. Inst. C.E.

The Lectures will be held in the Engineering Department, Coupland Street, on Thursdays, at 5-30 pm.
A fee of one guinea will be charged for the five Lectures.
Engineering firms may obtain tickets for their staff or pupils at half-a-guinea, provided application is made to the Registrar for not less than six tickets.

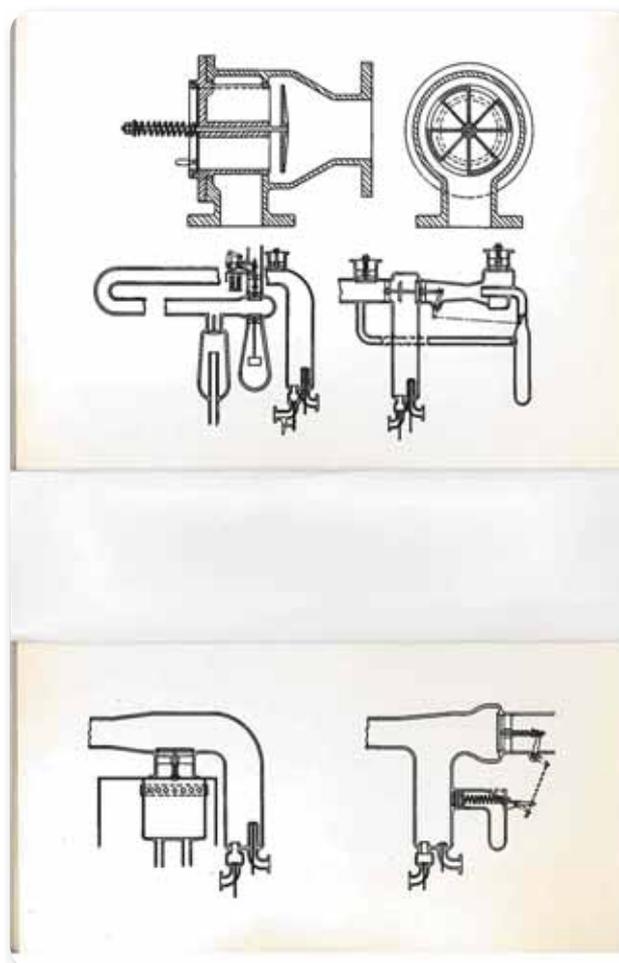
“ All my data and records ... have been burnt in an incinerator. It took my gardener 3 weeks to do all the job ”

provided time to work on inventions, notably a four-stroke internal combustion pump driven by producer gas, the Humphrey Gas Pump, adopted by the Metropolitan Water Board at Chingford, in 1913.

After the Great War broke out Herbert Humphrey's patriotic fervour encouraged him to invent a one-man torpedo, which, on 23 November 1914, he advised Winston Churchill at the Admiralty, would cause “certain destruction to the torpedo and man as well as the Dreadnought, yet I would willingly be the first to put the idea into practice.” Churchill, fortunately, did not accept the offer. Had he done so the story of the wartime and postwar British chemical industry might have been very different. My historical research focuses on this aspect of Humphrey's career.

During the war, as Humphrey's papers clearly show, his prior experiences, not a little ambition, and skills in networking, enabled Humphrey to provide technically grounded advice in chemical manufacture as a ‘volunteer’ at the Ministry of Munitions. This was put to good use from 1919 as consulting engineer in connection with manufacture of synthetic ammonia at Billingham. The site was developed by Brunner, Mond & Co., which in 1926 merged with three other firms to create Imperial Chemical Industries. The contribution of Humphrey's papers to the story of Billingham is currently my main interest.¹

Since Humphrey was a prolific inventor throughout his life it is possible that not a great deal of the lost material related to the early years of ammonia manufacture in Great Britain. Certainly, as the papers at Imperial Archives show, he retained sufficient documentation to provide us with a good overview of his leading role in the collaborative endeavour that led to successful manufacture during the 1920s. This is important primary source material. Though the Billingham ammonia process imitated the famous German Haber-Bosch process, there were many innovations. Humphrey undertook critical experiments with high pressure apparatus, was,



Humphrey pump diagrams

along with colleagues, exposed to the dangers inherent in this work, oversaw construction of buildings, took charge of daily operations, and designed a power station that made the factory independent of external sources of energy. This heroic enterprise completely transformed the way in which chemical industry in Britain was conducted. It was nothing less than a paradigm shift. Aldous Huxley was so struck by the scale, layout and organization of the Billingham factory that it served as an inspiration for his *Brave New World* (1932). Taken together the Meldola and Humphrey papers constitute an almost unique resource for exploring and interpreting processes, both scientific and social, and individual activities, in chemistry and chemical engineering before 1930. The overlap of the collections is particularly striking: Meldola represented the synthetic dye industry, the main area of science-based chemical activity before 1914; Humphrey represented the high-pressure synthetic ammonia industry that became a main area of interest from 1914. Moreover, dyes and ammonia were major strategic industries.

These two rare collections are currently enabling considerable enhancement of the process of historical reconstruction, including, usefully, with connections to other archival material. For example, in the 1990s, the Edelstein Collection at the Israel National Library received copies in microfilm of the archive of the American Solvay Process Company, in which Brunner, Mond & Co., held an interest. While going through Humphrey's papers I came across two items which suggested that a search through the Solvay Process Company archive might help to fill in some of the gaps that were exposed. This paid off. Not only did names of Humphrey's colleagues in Britain turn up, but so too did dated summaries of their research, which revealed not only new information about Billingham but shed light on the extent to which the transatlantic sharing of information around 1920 contributed to the development of chemical industry and technology transfer. Finally, researchers are indebted to archivists and curators for turning disparate documents into viable working collections.

Anthony S. Travis

The Hebrew University of Jerusalem

Images supplied courtesy of Archives Imperial College London

¹ An annotated list of Humphrey's papers can be found in Jeanne Pingree and Denis Smith, compilers, Imperial College of Science and Technology, University of London, *List of papers of Herbert Alfred Humphrey, ACGI, FCGI, M Inst CE, M I MECH E, MIEE* (London, 1971).

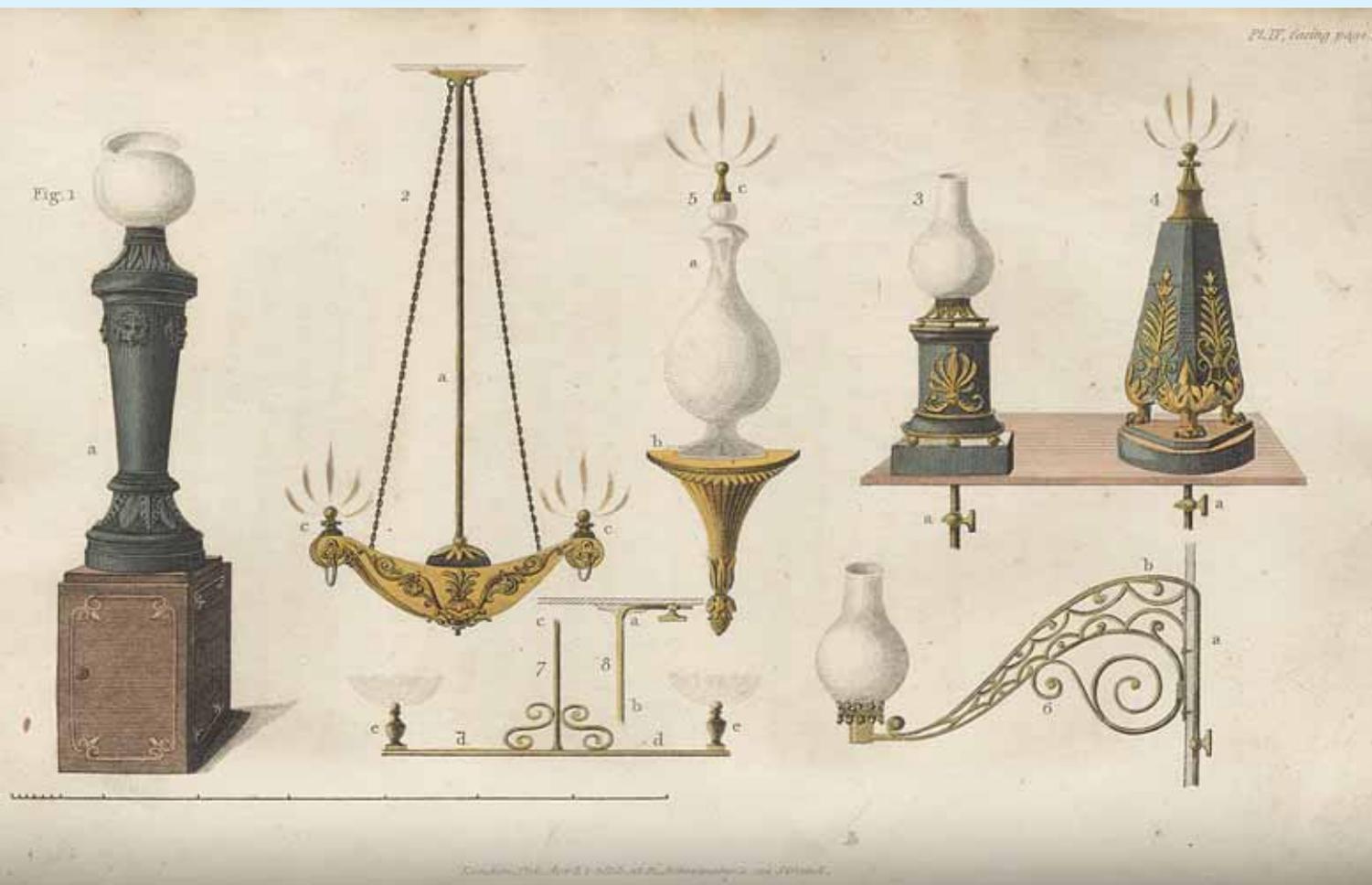
Silvanus Phillips Thompson: a many-sided crystal

Anne Locker explores the contents of a rare and extensive collection.

The title of this article is taken from a workshop held on 16 September 2016 to mark the centenary of the death of the Quaker physicist and electrical engineer, Silvanus Phillips Thompson (1851-1916). The aims of the workshop were to bring together researchers, to investigate Thompson's significance in the history of science and bibliography, and to identify areas for future investigation. The programme included a range of fascinating papers on Thompson's life and work, reflecting his own eclectic interests. The papers included



Portrait of Silvanus Thompson (1899), 23_0022



Accum, *Practical Treatise on Gas-Light* (1815), SPT RB 4TO o2, plate 4

significant use of archival material, including Thompson's personal book collections.

We heard about Thompson's own publications, technical and biographical, his influence on patent disputes of the time, his work in the emerging field of X-rays and the strong influence of his religious beliefs, and the archives he left at the IET (Institution of Engineering and Technology) and Imperial College. In this article, the author focuses on her paper, which looked at the Thompson collections held at the IET. The full programme, together with a biography of Thompson, can be found at: <https://silvanuspthompson.wordpress.com>.

Thompson's connection with the Institution of Engineering and Technology was as a past President but also as a bibliophile and collector. His collection of books, pamphlets and archives came to the IET (then the Institution of Electrical Engineers) after his death.

The Thompson collections comprise his personal papers, his library of rare books and manuscripts,

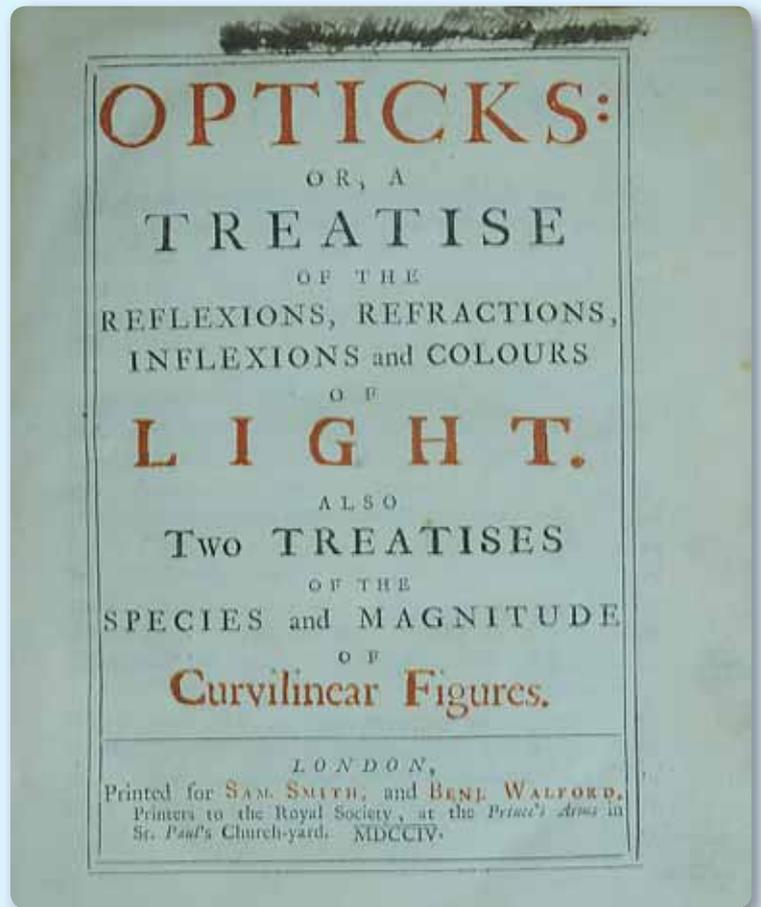
his pamphlet collection, and his working library. After Thompson's death in 1916, the Institution of Electrical Engineers (IEE), with support from the Council and many of Thompson's past students at Finsbury Technical College, purchased the collection to add to its existing library of rare books bequeathed by Sir Francis Ronalds. The Thompson collection is truly extraordinary: Thompson was interested in a vast range of subjects, scientific and historic, and collected many rare examples of early scientific works as well as thousands of contemporary pamphlets. I do not have the space to describe the entire library here, so I will concentrate on a few items which illustrate Thompson's interests as a collector.

Working with a personal collection such as Thompson's is fascinating, not only because it contains individual books and manuscripts of great interest, but because it sheds light on the life and personality of its collector/creator. An institutional book collection may have similar gems to those found in the Thompson library, but they would not have been acquired or managed in the same way.

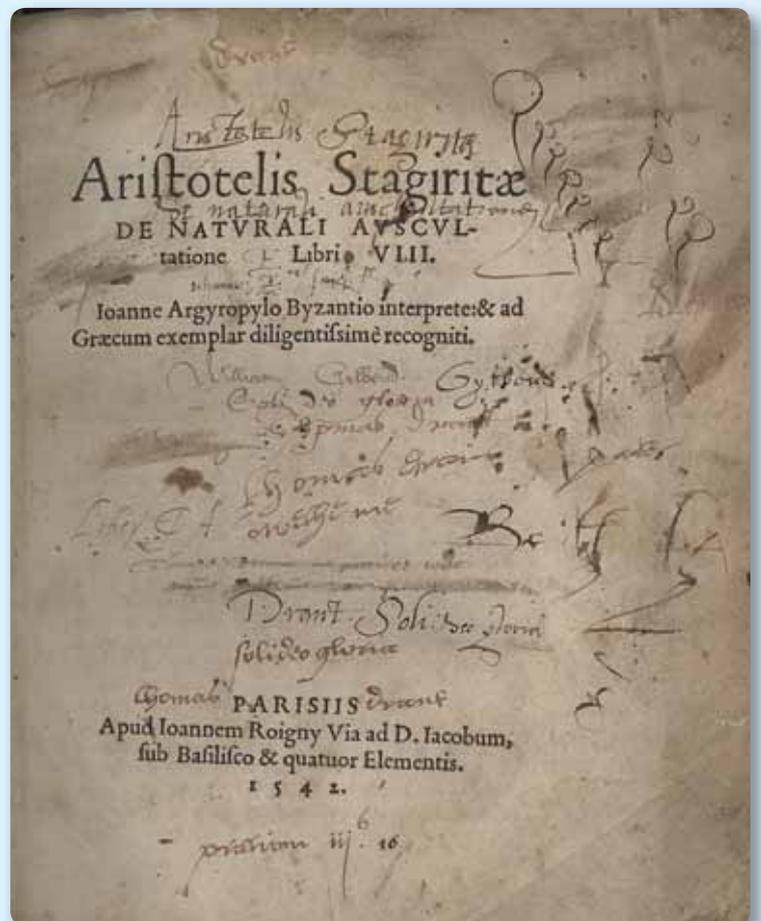
One example is William Gilbert, physician to Elizabeth I and the first person to use the term 'electricity' (a paper was also presented at the workshop concerning Thompson's translation of *De Magnete*). Thompson acquired several editions of Gilbert's works, the most prized being an excellent copy of the 1600 edition of *De Magnete* with the signature and marginal notes of William Barlow (d. 1625), Gilbert's correspondent and archdeacon of Salisbury. Barlow himself was an authority on magnetism and the lodestone, and was the author of *The Navigator's Supply* (1597) and *Magnetical Advertisements concerning the nature and property of the Loadstone* (1618).

What we might now term Thompson's 'acquisition strategy' reflected his detailed and thorough approach to research. As well as acquiring Gilbert's own works, he also obtained a number of related books. For example, the illustration of the smith in *De Magnete* comes from a book of fables, and a copy of this is in the library. He also acquired an edition of Aristotle's *De naturali Auscultatione* (1542). The book was bought by the bookseller Douglas Cockerell for its fine early English binding - he offered it to Thompson when he discovered the signature of 'William Gilbert' on the frontispiece. Thompson immediately bought the book, and discovered that it also included Gilbert's marginal notes and a list of his students.

From Gilbert, Thompson became interested in other aspects of the history of magnetism, for example the work of Peter Peregrinus (Pierre de Maricourt, fl. 1269). The oldest item in the Thompson library is a late 14th century manuscript of Peter Peregrinus on the magnet and Chaucer on the astrolabe. Thompson also became interested in the history of the compass, and the wind and compass rose. His paper, 'The Rose of the winds: the origin and development of the compass-card' was presented to the International Historical Congress in 1913, and later published by the British Academy. It drew on the considerable number of books and pamphlets Thompson had acquired on the history of navigation, and included interesting examples of wind and compass roses, including the rare rose from Blondus, *De Ventis et Navigations Libellus* (1546) - unusually, it has only 26, rather than



Newton, *Opticks* (1704), 144_0003, title page



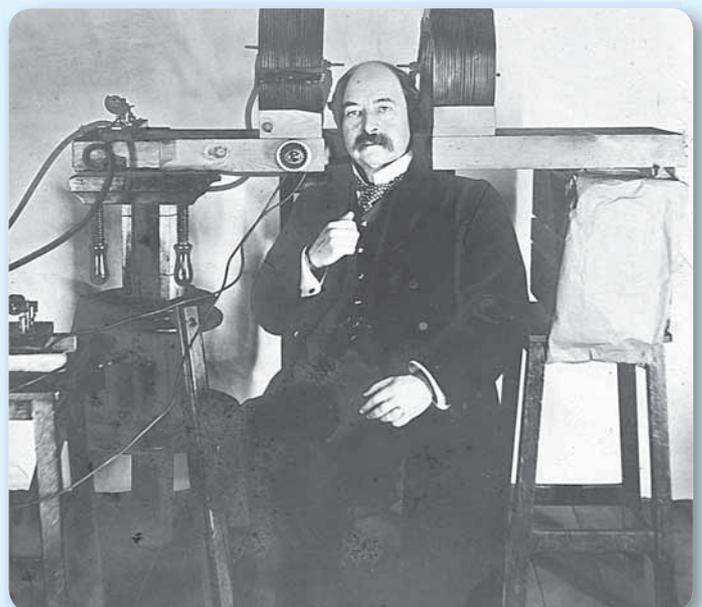
Aristotle, *De Naturali Auscultatione* (1542), ST 8VO o2 SPT RB, title page



Gilbert, *De Magnete* (1600), SF Fol 04 SPT RB, p. 139 (detail)

32 points, meaning that Zephrus, the west wind, is not directly opposite Eurus, the east wind. *De Ventis* also includes directions for sailing to the New World. A related navigational text in the collection is Martin Cortes' *Breue compendio de la sphaera y de la arte de nauegar* (1556).

Unsurprisingly, as a teacher of electrical engineering Thompson also collected around the history of electricity. Some of the finest works in this area include Benjamin Franklin's *Experiments and Observations on Electricity ... at Philadelphia, in America* (1751), which bears the bookplate of the Penn family of Pennsylvania. His library also includes two rare editions of Galvani's *De viribus electricitatis in motu musculari*. Thompson acquired the very rare first edition from 1791, and also a copy of the 1792 edition, presented by Galvani to his



Silvanus Thompson, self-styled 'Brother Magnetizer' of the 'Sette of Odde Volumes' Bibliophile Club, applying experimental electromagnetic stimulation to himself

“Working with a personal collection such as Thompson’s is fascinating”

rival and disputant on the theory of electricity, Alessandro Volta.

The workshop covered many of the facets of Thompson’s professional work and personal interests. I will finish with a small sample of works from across the collection:

- Optics: Hooke’s *Micrographia* (1665), possibly with MS annotations by Hooke; Newton’s *Opticks* (1704); contemporary pamphlets and advertisements on optical illusions
- Surveying and measuring instruments: *Methodus Geometrica* (1598)
- Lighting: *Accum, Practical treatise on gas light* (1815), contemporary pamphlets and advertisements on electric light
- X-rays and vacuum tubes: von Guericke, *Experimenta nova* (1672); X-ray of SPT’s hand; contemporary pamphlets and equipment catalogues

If you would like to find out more about the Thompson collection, the IET Archives (including the rare books collection) is open by appointment: please visit <http://www.theiet.org/resources/library/archives/archives-contacts.cfm> for more information.

Anne Locker

Institution of Engineering and Technology

Isis Cumulative Bibliography of the History of Science: advances in access

Stephen Weldon introduces a new open access reference resource.

IsisCB Cumulative (<http://cumulative.isiscb.org/>) is a digitized version of the Isis Cumulative Bibliography of the History of Science, spanning sixty years from 1913 to 1975. The full text is available as seven large HTML files corresponding to the seven volumes of the Isis Cumulative Bibliography covering that period.

- IsisCB Cumulative is a companion to IsisCB Explore (<https://data.isiscb.org/>), a research tool launched in 2015 that includes data from the Isis Bibliographies from 1974 to the present.
- IsisCB Cumulative is the result of two years of effort that included scanning, transcribing, and encoding 5000 pages of text. The files contain nearly 154,000 citation records to works in the history of science, all of which are classified by historians of science and subject bibliographers. These include citations to about 83,000 articles, 44,000 books, 20,000 reviews, and 6,000 chapters.



IsisCB screen-shot



Digitising IsisCB

STAG and the CSA continuing scientific adventure in partnership

The Science and Technology Archives Group (STAG) aims to:

- create a network for all those who have an interest in scientific archives, including engineering
- share knowledge
- raise awareness of the value of scientific archives in all media and formats for research, education and public enjoyment.

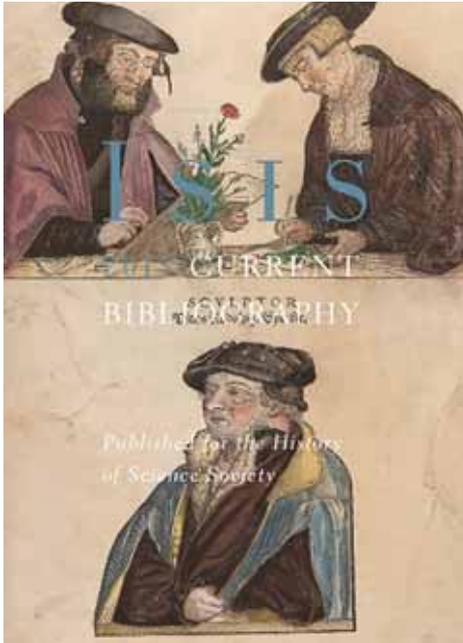
The establishment of STAG has been a seven year gestation of continued dialogue. The Centre for Scientific Archives (CSA) (<http://centreforscientificarchives.co.uk/>) made representations when it was created in 2009 and also in 2011, to The National Archives (TNA). These representations were not only about the work of the CSA but also about the lack of national action on investigation of the state of scientific archives and of the papers of scientists. We need to be capturing archives, and encouraging scientists to think of depositing long before retirement. Discussions have since been continuous between archivists, historians of science, scientific organisations, ARA, the All Party Parliamentary Group on Archives and History, and TNA.

In 2014, TNA began serious discussions with relevant parties about a strategy to secure the UK's scientific heritage. Forming STAG was the considered response. In 2016, TNA acted and invited members of the archival and history of science community to create a group to look after the scientific archives sector. The STAG steering group consists of archivists and historians of science from relevant scientific, technological, engineering and other organisations, including the Wellcome and the British Library. The committee is in general agreement that the remit of the group should extend beyond archivists to all those interested in scientific archives. For example, researchers, teachers, journalists and other media specialists, entrepreneurs/businesspeople, designers and scientific alumni should be included.

This group is still quite new but after setting up the website in 2016, and launching the JISC listserve, membership has been increasing and we now have 80 subscribers. If STAG seems relevant to you, join the listserve (STAG@JISCMail.AC.UK) and watch for announcements there and on the website (<http://www.nationalarchives.gov.uk/archives-sector/projects-and-programmes/science-technology-archives-group/>).

Anne Barrett

Steering Group member, STAG and Chairman of Trustees, Centre for Scientific Archives



Isis Bibliography cover, 2015

- The current release of these volumes as individual HTML files is meant to provide temporary access to the digitized data, which will eventually be added to the IsisCB Explore service.
- IsisCB Cumulative and IsisCB Explore contain data accumulated and published annually and semi-annually in the journal *Isis* since its founding. Established by George Sarton, this bibliography has been continued by various scholars and librarians, including John Neu, Magda Whitrow, Joy Harvey, and, currently, Stephen Weldon.
- The online publication of IsisCB Cumulative was made possible by the Alfred P. Sloan Foundation, the History of Science Society, the University of Oklahoma Libraries, and the University of Oklahoma History of Science Department. The digitization efforts were overseen by Stephen Weldon, Sylwester Ratowt, and Conal Tuohy. Tuohy (see his website at <http://conaltuohy.com/>) parsed the transcribed text and created the HTML file (see <https://github.com/IsisCB/IsisCBLegacyDigitization>).

For more information about the Isis Bibliographies see the project's website at isiscb.org. Individuals can also contact Stephen Weldon, editor of IsisCB, directly at spweldon@ou.edu.

Stephen P. Weldon

University of Oklahoma

The Museums and Society Reading Group

The Science Museum London has started a new discussion series based on selected texts: The Museums and Society Reading Group. Based in the Science Museum's Research and Public History Department, this reading group will discuss research at the intersection of museum studies, science and technology studies, history and philosophy of science and technology, and visual and material culture. The reading group will meet fortnightly on Thursday evenings from 5-7pm. The venue will be the Science Museum Library in the Dana Research Centre, 165 Queen's Gate, Kensington, London, SW7 5HD.

If you would like to be added to the Museums and Society mailing list, please email either Caitlín Doherty at crd37@cam.ac.uk or Jacob Ward at jacob.ward.12@ucl.ac.uk

Jodrell Bank First Light Project update

Jodrell Bank First Light Project is a Heritage Lottery funded project to preserve the story of Jodrell Bank's pioneer and later scientists and engineers, and present it in a new gallery. The project was previously reported on by the Director of the Discovery Centre, Teresa Anderson. It was since announced that a Heritage Officer was appointed in 2016 (see <http://www.jodrellbank.net/explore/news/>). The person appointed to the role is Dr Liz Bruton, an experienced history of science and museum researcher. Dr Bruton held the 2014-2015 Byrne-Bussey Marconi Fellowship at the Bodleian Library to research the Marconi Archives. Liz and her work can be followed on Twitter (@lizbruton) and at <http://manchester.academia.edu/ElizabethBruton>.

Calling all colleagues!

ARC is always seeking articles reflecting the issues that matter to you most. We would love to publish pieces that reveal the sector's opinion and showcase successful best practice.

If you would like to send something for inclusion in the magazine, please send articles to arceditors@archives.org.uk, or write and let us know what you'd like to read about. Guidelines for articles for ARC can be found on the Association's website: www.archives.org.uk.





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